JUNE
1949

PESTS
and their CONTROL

Laboratory testing for effectiveness of insecticides is tedious work. This apparatus is explained on Pg. 7

MAGAZINE OF THE PEST CONTROL
AND ALLIED SANITATION SERVICE INDUSTRIES

The makers of POWCO BRAND products announce the opening of new plant facilities at Huntsville, Alabama, to be operated by JOHN POWELL CHEMICAL COMPANY, subsidiary of John Powell & Co., Inc.

The strategic location of this "insecticide center" will offer additional convenience and greater accessibility of stocks to the agricultural South. Better all-around service to the insecticide industry everywhere will be possible with the expanded plant facilities and modern laboratories at Huntsville.

For *new* leadership in basic insecticide materials — *look to Powell!*

2,4-D AND INPC WEED KILLERS
DDT POWDERS AND LIQUIDS
BOTANICALS • ROTENONE • SABADILLA
PYRETHRUM POWDERS AND EXTRACTS
STIMTOX A
CHLORDANE POWDERS AND LIQUIDS
BHC POWDERS AND LIQUIDS
COTTON DUST CONCENTRATES
TOXAPHENE POWDERS AND LIQUIDS
TETRAETHYL PYROPHOSPHATE
ANTU
AEROSOL FORMULATIONS
PYRISCENTS (insecticide perfumes)
PYRINS

POWCO BRAND REG. U.S. PAT. OFF.
KILLING POWER—THAT'S THE THING!

John Powell & Co., Inc.

ONE PARK AVENUE, NEW YORK 16, N.Y.

Sales Offices: Chicago · San Francisco · Pittsburgh · Philadelphia · Fort Worth
Canada: Charles Albert Smith, Ltd., Toronto, Montreal · In Argentina: John Powell y Cia
Representatives in Principal Cities of the World

"ISOTOX® has proven itself the best chemical we've yet used in 27 years in the pest control business."

Writes Mr. CARL STROM, of the nationally-known WESTERN EXTERMINATOR CO. of Los Angeles:

"In our 27 years in the pest control business, Isotox Concentrate has up to now proven itself the most outstanding chemical we have yet used.

"Among its advantages are the facts that it combines residual control with an exceptionally quick knockdown. For carpet beetle control it is 'tops'.

"ISOTOX has also proved outstanding on moth control, giving immediate knockdown. Our operators now all request ISOTOX for their pest control work.

"The absence of an odor finds much favor in our type of business.

"We expect to use a great deal of ISOTOX in the near future in housefly control."

(signed) Carl Strom

We'll be glad to give you further information on ISOTOX, PERSISTO Sprays (DDT), ORTHO-KLOR Spray (Chlordane)—just call our nearest office... or use coupon below.

CALIFORNIA SPRAY-CHEMICAL CORP.
Lucas & Ortho Way, Richmond, California

Please send me further information on ☐ *ISOTOX*
☐ *PERSISTO Sprays (DDT)* ☐ *ORTHO-KLOR Spray (Chlordane)*
☐ Check here if you'd like free sample ISOTOX Concentrate

Name_____

Company_____

Address_____

_____

ISOTOX, made from the pure gamma isomer of hexachlorocyclohexane, is odorless... it's pleasant to use.

ISOTOX kills faster: 1. HOUSE FLIES (including DDT-resistant strain). 2. ROACHES. 3. CARPET BEETLES. 4. BEDBUGS. 5. ANTS; and many others.

ISOTOX kills insects 3 ways: 1. Residual action—Fumigation. 2. Contact. 3. Stomach Poison.

ISOTOX can be used in oil or water formulations through a wide variety of equipment... including HI-FOG method.

CALIFORNIA SPRAY-CHEMICAL CORP. ORTHO
Richmond, California • Elizabeth, New Jersey

Offices at: San Jose, Fresno, Modesto, Whittier, California • Portland, Ore. Yakima, Wenatchee, Washington • Boise, Idaho • Kansas City, Missouri Oklahoma City, Oklahoma • South Haven, Michigan • Orlando, Florida

ISOTOX, PERSISTO, ORTHO-KLOR, ORTHO Trademarks Reg. U. S. Pat. Off.

GENERAL CHEMICAL

PEST CONTROL MATERIALS

BASIC CHEMICALS

FOR AMERICAN INDUSTRY

. . . with Sound Values from Experience

First as the leading producer of sodium fluoride for extermination work and now as a major manufacturer of DDT and ANTU, General Chemical has served pest control operators for almost five decades. Its products are backed by sound research . . . quality control in production . . . and extensive experience in the manufacture of insecticides. For your requirements, phone the nearest office serving your territory.

DDT

Technical Grades, Finely Milled and Flake
50% Wettable Powder*
50% Dust Base*
10% Insect Powder
50% Livestock Spray Powder*
50% Commercial Building Spray Powder*
Emulsified Oil Sprays
Solvent Concentrates
Specialized Formulations

*Micro-Fine Particle Size

SODIUM FLUORIDE

Nile Blue Powder, 95% NaF

CHLORDANE

Wettable Powder
Dust Base
Emulsifiable Concentrate

ANTU

(Alpha Naphthyl Thiourea)

Technical Grade
Also prepared formulation of 20% ANTU—5% DDT Powder

GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo Charlotte • Chicago • Cleveland • Denver • Detroit • Houston • Kansas City Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh • Portland (Ore.) Providence • San Francisco • Seattle • St. Louis • Wenatchee and Yakima (Wash.)
In Wisconsin: General Chemical Company, Inc., Milwaukee, Wis.
In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

PESTS and their CONTROL

JAMES A. NELSON
Editor

JOSEPH R. GROSS
Associate Editor

Cooperating with

NATIONAL PEST CONTROL ASSOCIATION

Contributed articles in this publication do not necessarily reflect the opinions of the editors. Discussions, comments and all types of material pertaining to pest control and other sanitation services are invited from those interested in the advancement of the field.

All contributions must be in our hands by the 15th of the month preceding issue for which they are intended.

•

Published Monthly by
Trade Magazines, Incorporated

Publication Office
324 N. State St., Painesville, O.

Editorial and Advertising Office
1900 Euclid Building,
Cleveland 15, Ohio

Address all correspondence to the Cleveland Office

JUNE, 1949 **VOL. 17, No. 6**

CONTENTS

Latest Report on Fly Control
By W. N. Bruce 7

Fly Control Chemicals and Toxicities
By Ira Hatfield 9

How We Ran Toronto's Rodent Control Program
By Norton G. Whitaker 16

Book Reviews 20

What Formulation Shall I Use?
By W. E. McCauley 22

Controlling Flies with BHC 30

Comments by the Editor 32

Letters to the Editor 34

PCO News 36

Calendar of Meetings 36

PCO Notebook
By J. R. Gross 40

Organization News 42

Pestales 45

Classified Advertisements 46

Advertisers' Index 46

Single Copy price: 50 cents. **Subscription Rates:** 1 year, $4.00; 2 years $7.00. Countries outside of the United States, including Canada, 1 year, $4.50; 2 years, $8.00; 3 years, $11.00. **Change of Address:** Three weeks advance notice is necessary for change of address. Both old and new address must be given. **Advertising Copy:** Final forms close 15th of preceding month. If proofs are desired, copy must be in our hands by 10th of preceding month. Copy and insertion orders to be sent to our Cleveland address. Advertising cuts should be sent to Painesville Publishing Co., 324 North State Street, Painesville, Ohio. **Entered as Second Class Matter** at the Post Office at Painesville, Ohio, under the act of March 3, 1879.

ARE YOU READY FOR THE 'HOPPERS

WITH

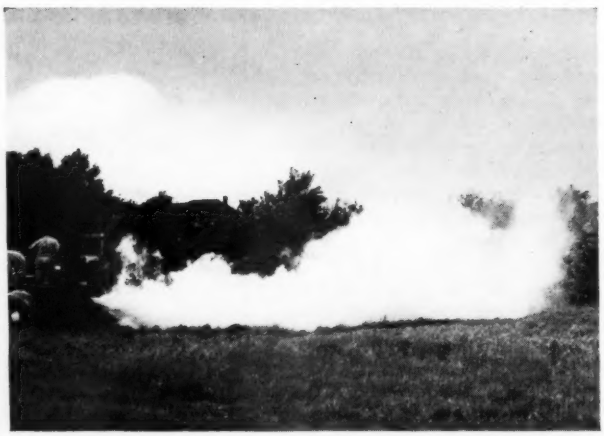
TIFA - *the ideal applicator*

Dispensing DEATH-DEALING FOG FOR INSECTS

Be prepared! You'll need this modern, **proven** weapon to wage effective war on the summer plague of grasshoppers forecast for the Midwest and Far West by governmental authorities.

Insure yourself **now** against the 'hopper hordes — investigate TIFA! TIFA distributes your chemicals in a true fog . . . more swiftly, cheaply and effectively than any other method.

Suitable for indoor or outdoor projects, TIFA is compact and sturdy . . . portable and self-powered, saving you on manpower and materials. A health necessity in recreational areas, on garbage and fill dumps — an effective tool on farms, ranches and in industry. Put TIFA to work for you today!



TIFA

TODD INSECTICIDAL FOG APPLICATOR

WRITE FOR NEW CIRCULAR

A PRODUCT OF

COMBUSTION EQUIPMENT DIVISION

TODD SHIPYARDS CORPORATION

81-16 4th Avenue, Elmhurst, Queens, N. Y.

LATEST REPORT ON FLY CONTROL

by **W. N. BRUCE**
Assistant Entomologist, Illinois Natural History Survey

THE AIM in any fly control program should be the reduction of fly population; first by sanitation, then the eradication of flies as much as possible with the use of insecticides.

Stable Flies

Stable fly control can probably be best effected by elimination of the major breeding places. Probably the most important breeding situation for stable flies is the accumulated feed and debris beneath out-of-door feeding racks. Where practical, these places should be cleaned out at least once a week. Probably a better procedure would be to exclude the flies from the breeding place by tightly boarding up the bottom of the feeding rack. This will not only exclude the flies, but prevent the accumulation of decaying feeds. Other sites where stable flies will breed, such as old hay stack bottoms and any accumulation of grass or weeds should also be eliminated. Experimentally, we have had good results in stable fly control by treating the more extensive breeding places once every two weeks with a spray containing one quarter (0.25%) of 1 percent gamma BHC. In addition to this, the major roosting sites of the adult stable fly were treated — trees in the barnyard lot and around the farm building, in addition to the outside surfaces of barns, sheds, and board fences. Such an application appeared to last about one month in the control of stable flies. No animal treatments were found necessary for stable fly control in these particular experiments.

Horn Flies

Horn flies are controlled by DDT or some of the residually active insecticides. We are no longer recommending the use of DDT on dairy animals or in places where the cows are fed or milked. For horn fly control on dairy cows, and a reasonable degree of stable fly control, the application of 1 percent piperonyl butoxide, and 1/10 percent pyrethrums, or a 1 percent methoxychlor is now suggested as a substitute for DDT. A dosage of one pint per cow once weekly or 1-2 ounces daily, if greater kill of stable flies are desired is adequate. On beef animals the use of 0.5 percent DDT spray is probably still the most acceptable toxicant; however, methoxychlor can be substituted with an expected residual life on animals of about 2/3 that of DDT.

Blow Fly

In this case as with all cases of fly control around buildings, sanitation is the most important factor in controlling flies. Nearly all blow fly problems have arisen from decaying animal matter and certain kinds of animal excretement, especially that of hogs and dogs. The treatment again is aimed at placing the insecticide in the roosting places of the adult fly. In addition, larvacides such as BHC and chlordane may be of some value. The roosting sites of the blow fly are mainly in low bushes, grasses, and the lower surfaces on buildings, including fences. They are, of course, most numerous around the breeding sites. A little critical observation of the habits or the places in which these flies are resting will assist you in treating for their eradication. Since many of the blow flies are apparently quite resistant to DDT by laboratory tests, and chlordane, although highly toxic, too slow to indicate its value in their control, the best insecticide would be the fast-acting materials such as BHC and Pyrenone.

Housefly Control

Again the best fly control is where satitation is practiced continually, but supplemented with the insecticides. Undoubtedly, resistant strains such as we have picked up in several places in Illinois are related to the degree of sanitation and the extent to which DDT has been employed. The resistant strains in Illinois have developed on premises that have been treated three or more years with an insecticide. Certainly another factor in the development of resistant flies is the exclusion of flies. In other words, the proper use of screens wherever possible. This would prevent flies from escaping a building with a sublethal dose of DDT. DDT is still recommended where resistant strains have not developed to such an extent as to make the DDT ineffective. Where there is a possibility of contaminating food and otherwise presenting a residue hazard, the treatment with DDT can be effectively used outside and in entrance ways where contamination is impossible.

Several strains of resistant

(Continued on page 28)

The above photograph shows Dr. Bruce operating a micro-syringe apparatus used for the topical application of insecticides to individual female flies while they're immobilized in a plastic CO_2 chamber during the treatment. Notice on the chamber (center) a large 2-inch lens which is used for sexing the flies. The insecticide is retained in a small 1/4 milloliter tuberculin syringe which is actuated by a micrometer calliper. This is turned by means of a light plastic ratchet, which can be set for different deliveries of insecticides by merely changing the position of the small brass rod which is secured to a semi-circular piece of sheet steel (lower left). This makes possible the repeated application of a certain amount of insecticide without watching the micrometer. In other words it is possible for the operator to focus his attention upon the needle and the fly.

Model 253 shown with the optional Wheat Lamp charger plugged in.

Especially Useful to Termite Operators

WHEAT

Rechargeable Spotlight

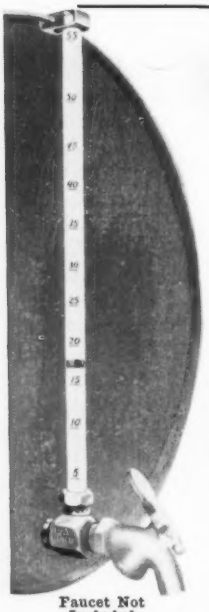
Acclaimed by PCOs as the most practical source of light for "on-the-job" inspections. No tangled extension cords to get in the way.

1000 hours operation • 25,000 candle power • 2500 foot powerful light beam • More economical operation than dry cells • Choice of bulbs — high powered for 6-hour service, lower candle power for 12-hour continuous use • Positive non-spill construction • Light weight — 95 ounces • Durable lens and case • Complete with wire stand, shoulder strap, mounting bracket, bulb and lens guard. Easy-to-use Lamp Charger also available.

PRICES

WHEAT Rechargeable Spotlight, $22.00 Lamp Recharger, $7.50

f.o.b. Cleveland, Ohio



Faucet Not Included

TRU-OIL-GAGE

FOR 55 GALLON DRUMS

Accurate-Convenient
Easily Installed

No Parts to Get Out of Order

Designed on the simple, trouble-free and most accurate principle of liquid seeking its own level. No more guessing — no more messy "stick" measuring. Reserve in the drum is noted at a glance. Diagram with instructions on each carton. Important—Safety valve checks the flow in case of accident or fire.

PRICES

$3.50 6 or More $3.00 each

f.o.b. Cleveland, Ohio

SPECIFICATIONS

• Top quality bronze T fitting • Standard tapered ¾" pipe thread for use on any standard 55 gal. drum • Has ½" leeway for possible variation in drums • 5 gal. red numeral calibrations on clear tubing • contains red cork float • Strong rust-proof bracket & bolt to secure to top rim of drum. Brass cap and screen air vent — guard against fire and dirt • With compression nut & gasket to secure gauge tube to bronze fitting • Accurate machined & assembled • Weighs approximately 1 lb. in corrugated shipping box.

SUPERIOR EQUIPMENT CO.

2115 East 18th Street CHerry 3894 Cleveland 15, Ohio

FLY CONTROL CHEMICALS AND TOXICITIES . . . . .

by **IRA HATFIELD, Consultant** — Webster Groves, Missouri

IT HAS LONG been known that flies are a nuisance, that they are filthy and carry diseases, and that the health of a home or community is closely related to the efforts expended to hold the fly population down. Because flies have been recognized as nuisances for centuries, various methods of dealing with them have developed.

As chemicals came into prominence, we had the flurry of papers coated with sticky substances or dishes or pans containing solutions of arsenic or other poisons, and finally spray materials with varying degrees of toxicity both to flies and to humans.

What is a Fly Control Chemical?

It might seem silly to ask the question, "What is a fly control chemical," but yet the definition you would get would depend upon whom you asked the question. The National Association of Insecticide and Disinfectant Manufacturers (NAIDM) has set a standard and a method of test for fly sprays, and by their method of test only a certain percent of flies have to be killed in order to have a fly spray of the highest rating.

Chemical manufacturers use the NAIDM system of grading, but they often go a step further. They tell you how you can kill all the flies — by a given method, which method, by the way, is always different from the conditions which will exist in a home, dairy barn, grocery or restaurant.

Since the war, the public has had another standard for judging fly sprays. Whereas they formerly "swept" the flies from their picnic table with the wave of an arm or the flurry of a newspaper, they now point out the single fly and say, "That's the pest they told us would become extinct!" This attitude has made it easy to sell the psychology of "knockdown" chemicals, but these products without good killing action have not actually pleased the public.

Whereas meat counters, fish markets and other food handling areas formerly battled legions of the flies day in and day out, they now look at the few flies and curse the false advertising of fly control chemicals. Somehow the public has reached the state of education or miseducation where it believes that miracle chemicals are just that — miracles — that all other control measures can be ignored and that chemicals will or should do the total job.

What does the pest control operator believe? He knows that his profession does not recognize that any pest can be "eradicated" or eliminated. His job is as his name implies—a Pest CONTROL operator, not an exterminator. But he has the right to believe that if a manufacturer brings him a fly control chemical, that chemical will do an efficient job of fly control if it is applied according to the manufacturer's recommendations. He is not interested in an LD^{50} — that is not good enough. He is interested in an LD^{95} and has a right to expect that the manufacturer will give him the LD^{95} value for the product 12 hours after application. That will make it possible for him to judge whether a fly spray applied at night will actually show good control when the business establishment opens the next morning.

Another thing he wants to know and must know. Will a given formulation work on glass, painted wood surfaces, plaster, cement, wallpaper, and other surfaces? Any or all of these surfaces may be encountered in a large estaablishment, and the manager of that business wants fly control, not excuses.

There is still another point of extreme interest to the pest control operator. Does the addition of a quick knockdown agent to a residual spray actually serve the operator's best interests? Does it keep the fly from getting a lethal dose of the residual chemical, and thereby reduce the value of the residual chemical? Is there information of value on this subject?

We can see from these different points of view that there are really many requisites placed on a good fly control preparation, and we can also see that many of our present day formulations fall short of the desired goals.

Some Chemicals Proposed for Present Use

The patent office contains the listing of thousands of materials reported by the patent applicant to be of value as fly control chemicals. Only a few of these can be discussed briefly here.

One of the early fly control materials is generally referred to as *pyrethrum*. In reality, when pyrethrum flowers are extracted, two insecticidally active materials are recovered. They are known as pyrethrins I and II. These materials are often sold in the form of a concentrate, and are diluted with an oil base material to produce a ready to use spray. We have mentioned pyrethrum as one of the earlier spray materials. To the writer's knowledge, the first kerosene extract of pyrethrum flowers sold in the United States as a household insecticide was "Walker's Devilment" in 1916.

When a spray solution is prepared so that it contains the extract of ½ pound of high test pyrethrum flowers per gallon of oil solution (or contains 100 to 120 milligrams of pyrethrins per 100 millileters of spray), a suitable fly spray is obtained according to the standards set by the NAIDM. Furthermore, depend-

* Based on a talk given at the Michigan State College Pest Control Operators Short Course, East Lansing, Michigan, earlier this year.

Picture Courtesy
American Museum
of
Natural History
New York City

ing upon the chemicals used for extraction and depending upon the petroleum oil used as the carrier, it is possible to make a product which, at the concentration used for fly control, is considered non-toxic to man and warm-blooded animals when taken orally (through the mouth) or breathed. A few people are allergic and some develop a dermititis from its use, but it is still a question whether this is due to the pyrethrins or to the carriers. In making this statement on toxicology, limitations were purposely placed on the formulation discussed, for knockdown agents or perfumes or other materials added to the formulation can change the toxicological picture.

Let us next consider *rotenone.* Rotenone is one of the materials extracted from derris roots, and is known to have insecticidal properties. Pure rotenone is a resin having a melting point of about 163° C. It has a low solubility in insecticide base oils, and acetone and/or petroleum ether is often used with base oils in preparing insecticidal formulations. Rotenone has a low killing power against flies, and it is questionable whether the addition of rotenone to pyrethrum sprays aids the value of the spray as a fly control formulation. This does not mean that there may not be extracts of derris that are toxic to flies, but from the information at hand, there is insufficient evidence to prove that rotenone as such has a place in the fly control program.

Without trying to name in order the compounds that have appeared on the market, let us next turn our attention to some of the pyrethrum substitutes that have appeared. Some have been suggested as total replacements for pyrethrum, others as combining materials but with no thought of their being synergists. Thousands of materials have been named as "companions" for pyrethrum, and at least 500 of these are thiocyanates and isothiocyanates. One such material with which you are familiar is betabutoxy-beta-thiocyanodiethyl ether (also known as n-butyl carbitol thiocyanate). A 50% solution of this in mineral oil is known as *Lethane 384.* An other familiar product is a composition consisting of 12.5% of the above mentioned thiocyanate, 37.5% betathiocyano ethyl esters of higher alaphatic fatty acids, and 50% mineral oil. It is called *Lethane 384 Special*

These products are known to have good knockdown action on flies, and it is possible to make Grade AA sprays with them. But they do not have a residual action, and although that may appeal to the householder who can apply them often, it is a question as to what place they can have for the Pest Control Operator unless they are used in conjunction with other materials. To mix them with other products in order to take advantage of their quick action is of course satisfactory in some cases, but the one who does the mixing should not only be concerned with the chemical compatibility of these Lethanes with the other products, but they should have clearly in mind what effect these materials will have on the residual action of materials used in conjunction with them.

Still another thiocyanate to come on the market is known by the trade name *Thanite.* Its manmanufacturer says it contains at least 82% isoboronyl thiocyanoacetate and 18% other active terpenes. It is also referred to as largely fenchyl thiocyano acetate. This product, like the Lethanes, will give a quick knockdown, but where a good kill is required, it is often mixed with a product that has greater killing power even though it has a slower knockdown value.

While we are still on the subject of materials that have been suggested for use with pyrethrum, we should not overlook the entry into the field of *piperonyl butoxide.* This product, which came into the picture during the war, was found to be a safe and stable insecticide. Furthermore, it was learned that when it was combined with small amounts of pyrethrins, the combination produced a material with a quick knockdown, a good killing action, and a certain residual action. Studies of different combinations of piperonyl butoxide and pyrethrum indicated that the most efficient ratio of these products for fly control was approximately one part of pyrethrins to eight to ten parts of piperonyl butoxide.

To show what this meant to the experimentor, Peet-Grady tests were made with pyrethrum in oil, piperonyl butoxide in oil, and a mixture of the two in oil. The results of one such test are given in Table I. These results show the added value both in

knockdown and in kill of the mixture of these products.

Table I. Test results using the Peet-Grady test method on pyrethrum, piperonyl butoxide and mixtures thereof.

Material	Knockdown after 10 minutes	Mortality	Total Mortality
40 mgs. pyrethrum	82%	31%	34%
400 mgs piperonyl butoxide	22%	12%	65%
40 mgs pyrethrum plus 400 mgs piperonyl butoxide	98%	93%	94%

The way such a mixture could be used and the results obtained in laboratory tests on unfinished plywood surfaces is indicated in Table II.

is another story. Much depends upon the type of surface. If you cut a 10 to 1 with oil, you could use approximately 1 part by volume of concentrate with *about* 4 gallons of a base oil weighing 6.6 pounds per gallon. If you use a different concentrate, the manufacturer of the formulation should tell you how to cut it.

To answer question two—what are we waiting for? — the figures quoted were for a water spray applied to unfinished plywood. But suppose it was wallpaper or tile or concrete or a barn — suppose it was in sunshine or high or low humidity or a hot or cold room? What then? There is a great difference of opinion on this, and until the manufacturers or research people give us the answers to these questions, we will still be

Table II — Information on toxicity of piperonyl butoxide-pyrethrum spray to houseflies.

Milligrams per sq. ft. Pyrethrins	Piperonyl butoxide	Knockdown %	(Time in hours)	% Mortality (after 24 hours)	Age of spray deposit at time of test (days)
5	50	100	1	91	98
5	100	93	½	97	98
10	200	89	2	89	224
20	400	97	½	92	365

From Table II it will be seen that 5 mg. of pyrethrins and 50 mg. piperonyl butoxide per square foot of surface gave complete knockdown within 1 hour and 91% mortality in 24 hours on the 98th day after the spray was applied to unfinished plywood surfaces. By now there should be at least two questions in your mind. One is, how do you get the 5-50 mg. on a square foot of surface, and the other — if this product is so good — what are we waiting for?

To answer the first question, if you will cut a 10 to 1 concentrate (miscible, of course) — one part by volume of the concentrate with 3 parts by volume of water, and apply it at the rate of 2 cc. per square foot of surface (or 1 gallon to 1875 square feet or 1 quart per 12 x 12 room), you will be applying about 2 cc. per square foot of surface. Whether or not you can be assured that an application intended to give 2 cc. per square foot, actually gives 2 cc. per square foot of surface operating on a strictly trial-and-error basis.

It is the writer's opinion that a pyrethrum - piperonyl butoxide mixture will serve a good place as a fly spray material in food establishments, but it would be taking a big chance to guarantee to "fly-proof" a place with it or any other material. Furthermore, it is the writer's opinion that piperonyl butoxide-pyrethrum or any other material cannot be depended upon to give three months residual under normal use conditions, for dust, cooking greases, washing, etc. all affect even the most effective fly control chemicals.

Let us now turn from the realm of pyrethrins and their substitutes or replacements or synergists, and discuss some of the other newer materials that have been used or suggested for use as fly control chemicals. The first of these newer products to enter the field was dichloro diphenyl trichloroethane—commonly known as *DDT*. It had a *noble past*, but due to a number of circumstances, it has fallen into at least a *semi*-disrepute.

When DDT was used so extensively by the military, civilians and you PCOs said — "Lead me to it!" You itched to get your hands on it. You got it, used it, and at the Chicago National Pest Control Association Convention, many PCOs were scared to death it was going to put them out of business.

Personally, I think DDT will kill house flies, I think DDT produced in 1948 or 1949, applied like the 1946 and 1947 DDT was applied, will give results comparable to the 1946 or 1947 results. But, you say, haven't you heard of DDT resistant flies? Don't you believe in them? Yes — double yes — I have heard of them and I believe in them.

BUT, Let's go back to 1946. The army and city health departments were the boys that were getting the publicity then. For residual action from hand sprays, they found that for a 5% DDT emulsion or oil spray used at a dosage of 200 mg. of DDT/square foot of surface or 1 gallon of 5% solution per 1000 square feet of wall space, they got good action. That's 1 gallon of 5% spray per 14 x 15 room. Did you ever apply it that heavy? Did you, in restaurants, hotels, better class homes and grocery stores, apply 5% DDT in Shell E-407 or Velsicol AR 50 at the rate of 1 gallon per 14 x 15 room? If you did, did you get run-down, customer reaction to odors, etc.?

Then came aerosols, vaporizers, fog machines, and a host of other types of application equipment. What did they hope to do with DDT? Exactly the opposite of the army and public health work! They wanted to put on very little DDT with solvents or propellents or mechanical methods that left no residuals except residues of crystalline DDT. Control went down, complaints came in, resistant flies were the excuse for ineffectiveness, and we swallowed the whole thing. Personally, I can't subscribe to all the stuff that has come out from sales minded research papers, from laboratories that are supposed to

be doing a good job of getting and distributing facts. I believe we need more facts!

We need not spend much time on the results obtained with DDT on flies. From its introduction it was known to be about of the same toxicity to flies as pyrethrins, but it had a slow knockdown value, a longer residual, and a greater toxicity to man and animals. Before you used your first gram of material, it was public knowledge that it was stored in animal tissues (especially fats), and that it could be passed from the body in secretions of milk as well as in the waste products excrements. Probably DDT was released to us too soon, but I do not blame the Pest Control Operators for that. We dispense and use what is released to us; if it wasn't ready for use by Pest Control Operators, it is certain it did not belong in the hands of untrained people called the public.

As the limitations of DDT became more apparent, analogues, homologues and derivatives were tested both in the United States and abroad. The Germans were using GIX, the difluro- instead of the dichloro-diphenyl-trichloroethane. It was more toxic to many insects including flies than was DDT, but never became popular in the U. S. because its cost of manufacture made it less interesting than certain other products.

Probably the two most interesting fly control replacement materials for DDT were *DDD* (also called *TDE*) and the methoxy analog called *methoxychlor* or methoxy DDT. What about these two products? TDE is about half as toxic to the resistant strains of flies (Bellflower, for instance) as DDT, but since it is only one tenth as toxic to warm-blooded animals, it was introduced to the trade as a safer product than DDT. But it was found that it wasn't such a good fly killer — it killed the flies — but not dead! Somehow they resurrected again and so the material wasn't tops.

Then and as of *NOW*, *THE* answer, so far as DDT derivatives are concerned, is the methoxy analog or *Methoxychlor*. Its LD_{50} is about one-tenth that of DDT, or to put it another way, it takes only one-tenth as much of it to kill resistant flies as of DDT. It is half as toxic to warm-blooded animals as TDE, so it is supposed to be safer than DDT or TDE.

So much for DDT and its derivatives. Let us go now to *Chlordane* or Chlordan, sold under such trade names as Octa-Klor or Velsicol "1068." It made a royal entry into the field of insecticides, and to my way of thinking, it was one of the most interesting of all the new materials to appear by 1947.

To strains of flies which were easily killed by DDT, it had a better toxicity than DDT, and to resistant strains it was 160 times as effective. It had a low knockdown value, and although it did not have the residual of DDT, it usually lasted for at least two to four weeks, often longer. Because of its low knockdown value, the tendency has been to add materials to chlordane formulations to import this quality to them.

In general, 2% oil or emulsion sprays have been used with good success. Thorough treatment of breeding places as well as the laying down of residual sprays on basement and other walls could, in most cases, be depended upon to give good fly control.

Another new chemical which has come to the attention of the Pest Control Operator is *toxaphene* (also known as chlorinated camphene). To date, this product has not been recommended by its manufacturer for use as a household fly spray material. It is known that low concentrations of toxaphene applied to fly breeding areas will prevent fly larvae from emerging, and that as little as ½ to 1% toxaphene in insecticide base oil will kill adult house flies when used as a residual spray. Both the knockdown and the rate of kill is slow. Since this product is not recommended for household use, no further discussion will be given here, but additional comments on the product will appear later.

The last two materials to be discussed will be considered together. They are *benzene hexachloride* (also known as BHC, Gammexane, Gammex, "666", etc.) and the gamma isomer often referred to as GBH. The latter product also appears under several trade names. Although the technical grade of BHC contains several isomers, it is generally conceded that the gamma isomer is the most toxic one to flies. It is also often stated that the strong musty odor of BHC is due to impurities; that the pure gamma isomer is practically odorless.

When it was learned that DDT was not doing an adequate job of fly control in the 1948 season, BHC tests were initiated to see if it could be substituted for the DDT. Despite glowing reports as to its quick knockdown value, its long lasting characteristics, and the utility of the *pure gamma isomer* for use in household sprays where no odor or irritating qualities were desired, it is questionable whether BHC should ever be used for fly control in homes or food handling or processing plants. That this product shows great promise for treating fly breeding areas is now well known, but the Pest Control Operator will do well to handle with extreme care any formulation of BHC for inside use in 1949.

Thus far we have discussed only the fly killing properties of these chemicals. What about their toxicity to warm-blooded animals or to man? It will be difficult in a few words to give a true picture of the toxicological aspects of each chemical, for the tabulation of the oral or the cutaneous effects does not tell the whole story. It is becoming more and more evident that the public health agencies are becoming more strict about some of these materials. It remains to be seen how far they will go in imposing restrictions for use of some of these products. It also remains to be seen if they will limit their use by competent applicators and let the materials remain for sale on retail shelves where they can be used by the general public without restrictions. Regardless of what restrictions are or are not imposed, it behooves the Pest Control Operator

CYANAMID'S EQUATION FOR SUCCESSFUL PEST CONTROL

MORE PROFITS

AERO* HCN DISCOIDS, Fumigant

The most generally used fumigant in the Pest Control industry. More dwellings, industrial buildings, railroad cars, ships and stored commodities are fumigated with hydrocyanic acid gas than with any other fumigant. Commercially pure hydrocyanic acid gas absorbed in thin cellulosic discs. One-pound and forty-ounce containers readily accommodate dosage requirements. AERO HCN DISCOIDS are simply scattered from the can. No dirt or mess in application or clean-up. Where insects and rodents are a problem in enclosed spaces AERO HCN DISCOIDS provide the answer.

CYANOGAS* A-DUST

The ideal outdoor fumigant for "cleaning out" rat harborages in city dumps, sanitary fills, under sidewalks, tight floors and pavements, and in fields, along ditch banks and levees. Applied effectively and economically with the handy CYANOGAS FOOT PUMP.

Not a bait . . . CYANOGAS A-DUST liberates hydrocyanic acid gas in the burrow. ALL rats, adult and young, breathe the gas and die immediately. No dangerous residues left to be picked up by unwary children or pets. CYANOGAS A-DUST is ready for instant use and requires no further preparation.

ACRYLON* Spot Fumigant

The liquid "spot" fumigant used for the destruction of insects by direct application to food-processing machinery. Indispensable for servicing flour mills, bakeries and similar food-processing plants. Not a general space fumigant.

ACRYLON also has been used successfully to fumigate clothes closets and other small enclosures in the home and elsewhere. (Observe usual fumigation precautions.)

CYANOGAS* G-FUMIGANT

A dustless, sea-sand size granulation of Calcium Cyanide liberating hydrocyanic acid gas. The same positive fumigant but of lower strength than AERO HCN DISCOIDS. Unsurpassed for easy, economical fumigation of small storage buildings needing only low dosages of gas. (Not to be used in dwellings.)

We shall be glad to send you full information concerning any or all of these insecticides and rodenticides.

*Reg. U. S. Pat. Off.

AMERICAN Cyanamid COMPANY

Agricultural Chemicals Division

30-W ROCKEFELLER PLAZA · NEW YORK 20, NEW YORK

Branch Offices: 709 Madison Ave., Toledo 2, Ohio • Brewster, Fla. • 1207 Donaghey Bldg., Little Rock, Ark. • 111 Sutter St., San Francisco 4, Calif.

to know the effect of these chemicals on the skin and to know how the toxicologist rates these products as to their potential danger to the health of man.

Recognizing the limitations in trying to present a toxicological picture in tabular form, we will attempt to give some such data in Table III. The information as presented is an attempt on the part of the author to translate information given by medical authorities into language understandable by the Pest Control Operator. If it is wrong, it is because medical authorities are unwilling to try to put the information in the form suggested by me.

Table III — Some Toxicological Information on the Chemicals Discussed in this paper

Chemical	Effect of usual formulations on the skin	Estimated fatal single oral dose to man	How it acts in the human system
Pyrethrum	Generally no irritation. No evidence it is absorbed through skin.	1.5 grams / kg. body weight or ¼ pound pure pyrethrins.	Since household sprays contain so little pyrethrum per quart, there is little danger of toxic symptoms under normal use conditions.
Rotenone	Sometimes mild irritation. Not absorbed through skin.		Much more toxic by inhalation than by oral administration. Because rotenone causes vomiting, overdose is not probable.
Lethanes (60, 384, 384 Special)	Although no apparent skin irritation by solutions, they do irritate mucous membranes and can cause respiratory troubles.	0.4 cc of 50% concentrate / kg. & upwards depending upon which Lethane is involved. 0.4 cc/ kg. equal ¼ pint of 50% concentrate.	Lethanes are cyanide derivatives. Either you get a dose that will kill you or you don't. They aren't cumulative in the body.
Thanite	Usually no apparent skin irritation. Can cause respiratory troubles.	2.0 cc of 50% concentrate / kg or about 1 pint 50% concerate.	Thanite is a cyanide derivative. Either you get a dose that will kill you or you don't. It isn't cumulative in the body.
Piperonyl butoxide	Generally no skin irritation. No evidence it is absorbed through the skin.	10 to 12 grams/ kg or 1¼ to 1½ pounds.	Relatively inactive pharmacologically.
DDT	Generally non-irritating to skin. *Can Be Absorbed Through the Skin.* Over 9 gms. (½ pint 5% solution) on skin daily becomes dangerous.	500 mg/kg or 1 ounce of DDT crystals.	The material accumulates in the body and can ultimately affect the liver and brain.
DDD or TDE	Slightly irritating. *Can Be Absorbed Thru the Skin.* Over 6 grams on skin daily becomes dangerous.	4 to 5 grams/ kg or 8 to 10 ounces of DDT crystals.	The material accumulates in the body and can ultimately damage the liver.
Methoxychlor	Slightly irritating. *Can be Absorbed Thru the Skin.* Over 36 grams on skin daily becomes dangerous.	8 grams/kg or 1 pound of Methoxychlor crystals.	The material accumulates in the body and can ultimately affect the liver.
Chlordane	May be irritating to skin. *Can be Absorbed Thru the Skin.* Over 2.4 grams on skin daily becomes dangerous.	100 mg/kg or between 6 & 60 gms of the pure product or 1 pt. to 1 gallon of 2% material.	The material accumulates in the body and can ultimately damage the liver.
Toxaphene	Moderately irritating to skin. *Can be Absorbed Thru the Skin.* Over 2.4 grams on skin daily becomes dangerous.	2 to 7 grams/ kg or ¼ ounce of pure chemical.	The material accumulates in the body and can ultimately damage the liver.
BHC	Irritation depends upon amount of gamma isomer present. The more gamma, the more irritation. *Can be Absorbed Thru Skin.* Over 1 gram on skin daily becomes dangerous	400 mg/kg or 1 ounce Technical BHC containing 15% gamma isomer; 200 mg/ kg or ½ ounce pure gamma isomer.	The material accumulates in the body and can ultimately damage the liver.

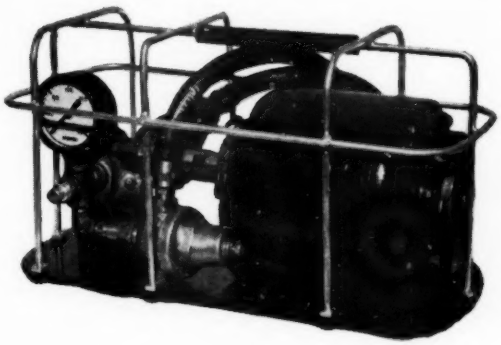
Perhaps after reading all of this information on the various potential fly control chemicals, you are ready for the question, "What is the fly control picture for 1949?" We can start right off with the assumption that we will have flies to control in 1949. That's for sure! We can also be sure that the purveyors of chemicals will be after the pest control operator to prove to him that x, or y, or z chemical will do the job. That's for sure too, for that's the job of the chemical salesman.

The information given previously in this paper has indicated that there is certain information still needed on all of the chemicals, such as the LD^{95}, the relative value of the chemicals when used on glass or wallpaper or plaster etc., the good or bad features of combining knockdown materials with residual chemicals, etc. Such information will generally not be ready in 1949, and this means that we will still have to operate in '49 on a partial trial-and-error method.

Furthermore, we do not know how strict the restrictions will be on *what* we can use *where*, but we do know that greater emphasis will be placed on being more careful on what is sprayed around food products.

To look at the problem realistically, I believe the pattern used by the Pest Control Industry will have to be somewhat as follows. Flies do not generally breed *in* the places serviced by the pest control operator. If they do, those breeding places should be eliminated from within the building. The breeding places are *outside* the buildings. Those places must be found and treated according to the control methods dictated by the conditions just as the army treated every puddle of water or half-filled tin can in their attempt to control mosquitoes. That

(Continued on page 26)



WHY YOU SHOULD OWN THE NEW PRESHUR-MITE JR. PORTABLE POWER SPRAYER

Tests of over 700 hours continuous operation simulating actual working conditions assure you of 4 to 5 years or more of dependable service.

It's powered with 1/3 HP, A.C., single phase, 110 volts, 60 cycle, 1750 RPM electric motor. (D.C. motors available at small additional cost.)

Has 25 feet of easily detachable chemical resisting, heavy duty, drop cord.

The pump has bronze housing and gears with stainless steel drive shaft.

A flexible coupling couples motor and pump . . . no belt drive.

An all bronze strainer protects the pump.

The Pressure Regulator is bronze with a stainless steel diaphragm. It's easily adjusted from 0 to 125 lbs. PSI, and acts as an agitator.

Four feet of suction hose are included. A copper tee at the intake insures free flow.

An agitation hose four feet in length is included with each unit.

Also included is one 100 foot length of spray hose, 1/4" I.D., 250 lbs. working pressure per square inch. Tube and hose cover will withstand solution used by P. C. O. Equipped with hose end couplings.

Hose quick connector is designed to eliminate labor in connecting and disconnecting. Push to connect, pull to disconnect.

Rugged 3/8" Bronze spray control valve with lever handle for easy operation, equipped with white metal valve seat.

Two foot long copper extension and spray nozzle. Your choice of spray nozzle types, and special nozzle for roach work.

3/16" steel plate motor and pump base.

1/4" round steel bars shaped and bolted to motor and pump base protects vital parts and serves as handle.

Rubber tubing is bolted across the bottom of each end of the base to protect polished surfaces.

As many as four spray hoses can be used simultaneously when not more than eight residual spray nozzles are being used at one time. Unit is equipped with one spray hose outlet.

Wherever there is liquid to be put under pressure, Preshur-Mite Junior can do it. It handles DDT, BHC, Moth proofing compounds, roach and general insect sprays.

Your regular container, bucket, can or drum, is the only other item required (not included).

SATISFACTION GUARANTEED, OR WE'LL REFUND YOUR MONEY.

MODEL 2A

Weighs only 44 lbs. and gives you from 0 to 125 lb. pressure and from 0 to 2½ gallons per minute. 16½" long, 8" wide and 9" high.
Price $147.50 FOB Jackson, Mississippi.

MODEL 3A

Weighs just 32 lbs., and gives you pressures from 0-100 lbs. 15½" long, 8" wide and 7½" high. 25 feet only of spray hose is included with this unit, plus 15 ft. of dropcord.
Price $132.50 FOB Jackson, Miss.

ONLY Preshur-Mite Junior gives you all these features, and only the Ewing Manufacturing Company makes the Preshur-Mite.

The EWING Manufacturing Co.

"THE CHOICE OF THE INDUSTRY AND OPERATOR"

P. O. Box 1986 **Phone 3-0343** **Jackson, Miss.**

HOW WE RAN TORONTO'S RODENT CONTROL PROGRAM

By Norton G. Whitaker

Rodent Specialist, Toronto, Canada

★

A graduate of the British Army School of Hygiene where he specialized in rodent and malaria control, Mr. Whitaker is a certified sanitary inspector operating his own consulting service. He was formerly with the City of Toronto Department of Public Health.

★

THE IMPORTANCE of Pest Control Operators in the intelligent application of the principals of rodent control cannot be denied. To ignore the Pest Control Operator in any campaign, attempting to bring under control rats and other pests, is equivalent to a general in the battle zone, ignoring his very best volunteer shock troops, and relegating them to a noncombatant role in a very large scale attack. Having in mind that, the Pest Control Operator has the practical knowledge, and the profit incentive, we, in our campaign here in Toronto, have invited full participation of the Pest Control Operators. Mr. Victor Prentice, Secretary of the Pest Control Operators is a member of the board.

Our campaign in Toronto is hampered by lack of proper legislation. If this committee does nothing else but get a new law passed, making it illegal to have rodents on the premises, then it will have justified its existence. This committee, the Citizens Volunteer Rodent Control Committee, has a large scale plan which we hope to finance outside the city treasury by voluntary contributions. These contributions are coming in slowly but we hope, that by the time we are ready to get into action, they will come forward in greater volume.

The apathetic attitude of the public has a great bearing on the success of a venture of this kind. To illustrate, take the case of one housewife in the downtown area, where the group of houses under inspection showed every indication of heavy infestation, claimed that she had the rats under control. When asked what method she was employing, she at first refused to answer. But later admitted that her husband threw a boot at them when they became too bold. In another case, on the examination of a business block in the downtown area, I inspected the premises of a lawyer, who told me I was wasting my time for he didn't have any food in his place and that it was hygienically clean. And it was, but, upon examination of his basement, we found about sixteen large burrows right up through the concrete. I talked to that man for over an hour about property damage, g o o d citizenship, bubonic plague, typhus, tuberemia, etc., and finally wound up by appealing to his sense of sportsmanship so he would not infest others in the block. After due consideration he came to the conclusion that, since the rats were staying in the basement, and not doing him any harm, why sould he harm them. These true stories are told to stress the fact that no campaign can succeed until the law is passed making it illegal to have rats on the premises and to enforce environmental sanitation. All the educational films, lectures demonstrations, etc., are not enough. One must have adequate legislation. We know for we tried the educational way first. People shuddered at what they saw and heard, then went out and did nothing about the menace. We must legislate to alleviate.

This committee we have formed in Toronto is composed of men who realize the dangers of the rat, as well as, the economic loss. While we have the blessing of the Department of Public Health, we are not a part of it. We are an entirely voluntary group acting without remuneration. Our work has been in the formative stage for more than six months and we hold one meeting a week to decide on policy, etc. We have framed a copy of the law that we want passed and have put it into the hands of the City Solicitor, who drafted a copy which was presented to the Provincial Parliament at its March session. When the law is passed we shall have the Rodent Control Section of the Department of Public Health working with us to do, more or less, the police work. Until such time as the law is passed we are continuing to make plans and formulating policy. In the meantime, have spot announcements on various radio stations, and all three of our daily papers have signified their intention of giving us the publicity we want. We asked for one column per paper per week until the law is passed, and then, whole page spreads. This was readily promised.

The Ways and Means Committee has zoned the city into sections, thence into subsections, groups and blocks, with appropriate captains for each section and block. These men were issued with an identification card and made a block by block survey of the buildings, lanes, etc., in that area. We invited volunteers from the Canadian Legion, especially those with war time gas experience, to help us with the gas teams to work the alleys, lanes, vacant lots, etc. These men were issued with one gas gun per crew of three men.

We opened a Rodent Control school one night a week for eight weeks and invited any one who so desired to attend, free of charge. In this way, we hope to produce potential speakers who will in turn be able to address other groups.

The school syllabus used is shown on the next page.

The school idea was hit upon when we invited the speaking section of the Young Men's Board of Trade to assist us in carrying our message to Home and School Clubs, Womens' Institutes, Kiwanis and Rotary Clubs, etc. We

MOLE CRICKETS...SOD WEBWORMS...SOWBUGS...STRAWBERRY WEEVIL...SILVERFISH

LEAF MINERS...ONION MAGGOTS...SQUASH BUGS...CARROT RUST FLIES...JAP BEETLE LARVAE...MOSQUITOES...APPLE MAGGOTS

ANTS...ROACHES...GRASSHOPPERS...LICE...MANGE MITES...FLEAS...FLIES...EARWIGS...CHIGGERS...CARPET BEETLES...PLUM CURCULIO

OCTA-KLOR

Octa-Klor* brand Chlordane

Agricultural • Refined

Basic toxicant for more effective control of Agricultural, Household and Insect Pests and animal ecto-parasites.

Concentrated and ready-to-use insecticide formulations containing Octa-Klor Brand CHLORDANE are available from leading suppliers.

For information and technical data, write,

Octa-Klor Brand CHLORDANE, Refined Grade is manufactured especially for indoor use by PCO's, under rigid laboratory control of **biological** and **chemical** standards.

*T. M. Reg. U. S. Pat. Off.

J H Co.

Julius **HYMAN** *& Co.*
DENVER, COLORADO

EASTERN SALES OFFICE
11 WEST 42ND STREET
NEW YORK 18, NEW YORK

WEST COAST OFFICE
25 BEALE STREET
SAN FRANCISCO 5, CALIF.

FLOUR BEETLES...WIREWORMS...WHITE GRUBS...CUTWORMS...BOLL WEEVILS...THRIPS

Program for
Toronto's Rodent Control School

January 18, 1949	**Subject**	**Speaker**
8:00	Citizens' Committee opens School —Chairman's remarks —general and purposes	
8:30	Film — "Vandals of the Night"	
9:00	History of the Rat	Dr. L. A. Pequegnat
	Problems presented by Rodents	W. S. Bomby
9:30	Explanation of syllabus and things to come	Norton G. Whitaker
January 25, 1949		
8:00	Review of content of previous session	Norton G. Whitaker
	Film	
8:30	How to detect rat signs	W. S. Bomby
9:00	Rat habits	Dr. L. A. Pequegnat
9:15	Trapping, various types	Norton G. Whitaker
February 1, 1949		
8:00	Review of content of previous sessions	Norton G. Whitaker
	The value of block control	K. Morton, City Health
8:45	Gas, its uses and law concerning same	Provincial Health Dept.
February 8, 1949		
8:00	Review of content of previous sessions	Norton G. Whitaker
	Rat Proofing	K. Sillier, Bldg. Comm.
8:30	Film — "Keep 'Em Out"	
9:00	Poisons, commercial, evaluation of same	Prof. L. A. O. Roadhouse
9:30	Poisons, antidotes	Prof. L. A. O. Roadhouse
February 15, 1949		
8:00	Review of content of previous sessions	Norton G. Whitaker
	Rat Harborages, removal of same	Norton G. Whitaker
9:00	Mice	Prof. Ray Heath, City Health
9:30	Educational	Trustee Charles Edwards
February 22, 1949		
8:00	Review of content of previous sessions	Norton G. Whitaker
	Cockroaches	Norton G. Whitaker
8:30	Environmental Sanitation	
9:00	Bedbugs	
9:30	Etopursites	Dr. Fallis
March 1, 1949		
8:00	Review of content of previous sessions	Norton G. Whitaker
9:00	How to lay out poison safely for all rodents	Norton G. Whitaker
9:30	Mouse control	Prof. Ray Heath
9:45	Free Discussion, repeat all pictures	
March 8, 1949		
8:00	Review and open question period. Free discussion	
9:00	Technique	

invited High School students to attend, but as these classes were to be held in the evening, they were not overwhelmingly popular with the teen-agers. However, we produced a large enough speaking section to provide all the major clubs with speakers and movies. While we feel that the law is most necessary, we also believe that an educational policy, backed by the implied threat of the law, is much the best. Those, who are too apathetic to be roused by a strong educational campaign, will surely be aroused by prosecution. I believe one of the Commissioners of the New York Police Force once said, "There's a wealth of reason in the business end of a night stick."

The PCOs in the person of Mr. Victor Prentice, promised us 100% co-operation and we knew we could depend upon them. Our main idea is to kill the rats, rat proof the city and practice environmental sanitation. We cannot have too many on our side. If we get this 100% co-operation, it will lighten our burden a great deal and allow us to achieve our end that much sooner. This is no fly by night effort, but is the first five-year phase of a long term campaign, and the PCOs are more than welcome into the fray.

After careful consideration of all toxic materials, we decided to use, Red Squill Fortified, 500/600 mgm per kgm, because of its emetic action, as well as the safety factor. Dr. Gordon Park Jackson, D.P.H., was not in favor of the use of 1080 because of the lack of knowledge of its potentialities. I agree that it is not paramount in city control measures to use 1080 for I have always regarded it as basically unsound.

In its wild state, and able to select its own diet, the *Rattus Norwegicus* does not make a habit to slaking its thirst with water but rather, draws it from the food it eats. Being personally acquainted with two experiments using 1080, I found the results as I had anticipated. But if the 1080 water is made up as usual and approximately six to eight ounces of dried blood is dissolved in the mixture before setting out, the results will be much more satisfactory. On the face of it, let us ask ourselves, why should the rat co-operate with us and drink 1080 liquid? Let us then make it attractive to him. Of course, better results would be obtained in slaughter houses by using something other than dried blood, such as anise flavor. Antu has its uses and should be used bearing in mind that it is equally dangerous to *Canis Familiaris* as well as to the *Rattus Norwegicus*. Any poison that gets down a rat's throat in sufficient quantities is a good poison, and so for wide spread use, in a large scale campaign, I respectfully suggest that cities outsmart the rat by using the least innocuous poison in the most attractive baits, leaving 1080 and the more deadly poisons to the PCOs who are experienced in their uses. Any dog that is accidentally killed during an anti-rat campaign, always turns out to be a pedigreed grand champion. No mongrel or stray ever picks up poison. Any poison should, in my opinion, be put under cover. One reason being that, the rat will more likely accept it under cover, and the other being that it assures a greater margin of safety to all other animals, both domestic and wild.

In Canada we have not paid as much attention to the problem of the rat as has the U.S.A. In fact, we have no service similar to that rendered by the Fish and Wildlife Service of the Department of the Interior at Washington, D. C., which, incidentally has been helpful to us in Canada. The problem here in Canada is that at no level of government have we instituted a concerted effort against public Enemy No. 1. Public Health men are inclined to regard the rat's actions and depredations as an economic loss only. Even if this were all, it is up to someone to stop these losses. We estimate

NEW from HUDSON

Special equipment for pest control operators

NEW STAINLESS COMPRESSION SPRAYER

Give it your hardest service, using virtually any chemical. The new Hudson "Industro" will stand up, without rusting or corroding. With stainless steel tank; stainless steel pump and supply tube; brass fittings throughout; oil and chemical-proof hose, gaskets and valve check, this is the sprayer for longest possible service at lowest possible cost. Easiest to use, too, with "Simplex" design. Cover seals from within — the higher the pressure, the tighter the seal. Extra-long pump with "Nu-Action" develops 30 percent more pressure with fewer and safer strokes. Available in 4 and 2¾ gallon capacities.

WIZARD LEKTRIK-SPRAY SPRAYER

Equipped with automatic time switch, this electric sprayer is ideal for unattended room treatment with space sprays. Nozzle adjustable for residual wet spray also, for hand use. Low-cost dusting attachment with 3-ft. extension converts it to highly efficient duster, for discharging dust into cracks, corners, high or low places. Available with toggle switch.

NEW "2-SPRAY" HAND SPRAYER

Switch from wet residual spray to fine space spray instantly by simply flicking nozzle pin. That's Hudson's "2-SPRAY." Nothing to unscrew, nothing to lose. Nozzle and brass syphon tube easy to remove for cleaning. Available with 2-2/3 quart galvanized container (shown), 1 quart tin plate container or 24 ounce glass jar.

WRITE FOR PRACTICAL HELP ON APPLICATION PROBLEMS

Ask for New Catalog of our Complete Line of Sprayers and Dusters

HUDSON

Tested and Proved EQUIPMENT

SPRAYERS AND DUSTERS
HAY TOOLS AND BARN EQUIPMENT
LIVESTOCK EQUIPMENT
FARM VENTILATION EQUIPMENT
POULTRY EQUIPMENT

H. D. HUDSON MANUFACTURING CO.

GENERAL OFFICES: 589 EAST ILLINOIS STREET, CHICAGO 11, U. S. A.

SALES AND SERVICE BRANCHES

NEW YORK CITY 7, 157 Chambers St.
SAN FRANCISCO 5, 43-45 Main St.
KANSAS CITY 6, 620 Broadway
MINNEAPOLIS 1, 324 Third Ave. N.
PHILADELPHIA 3, 1936 Market St.
COLUMBUS 1, O., 16 East 1st Ave.
OMAHA 8, Ninth & Douglas
MILWAUKEE 3, 440 N. Plankinton Ave.

that the loss in the City of Toronto to be eleven million dollars annually. A great many hospitals could be equipped and a good deal of research could be conducted for that sum.

There has been no outcry here about governmental authority interfering with Pest Control Operators. As a matter of fact, we think our program will bring in a "pot of gold" for the alert PCOs who know their business.

The province of Alberta claims to be rat-free. It is well aware of the danger of the rat and is closely following his progress across the neighboring province of Saskatchewan at a rate of seven miles a year. Alberta's program, at this time, is concentrating on a "rat exclusion program."

In any program all spectacular poisons or mechanical traps of weird and wonderful construction will never take the place of good hard work and plenty of intelligent application of the old principals with which we are all familiar. In any dealings with the *Rattus Norvegicus*, it is good policy to remember that, by body weight, he has more brains than a human being, and so we will simply have to outsmart him.

The following data on rodent poisons is the result of research done by L.A.O. Roadhouse, Department of Pharmacology, University of Toronto:

Common Name & Chemical Formula	Poison conc. in bait	Est'd range of L. D. 50 mgm/kgm.	Est'd L. D. 50 for 70 kgm.* man (mgm)	Poison in Bait mgm/oz.	L.D. in Terms of bait used in field in oz.
Alpha Naphthyl Thiouraea (ANTU) $C_{10}H_6(OH)-NHCSNH_2$	1:20	5-4000**	350-280,000	1420.4	0.2-197
Sodium Fluoroacetate (1080) $CH_2FCOONa$	1:1600 1:454 1:268	0.1-10	7-700	17.7 62.4 105.1	0.4-4 0.1-1 0.06-0.6
Fluoroacetphenylhydrazide (Fanyline) $C_6H_5NH-NHCOCH_2F$	1:20 (?)	0.1-10	7-700	1420	0.005-0.5
Thallium Sulphate Tl_2SO_4	1:65	15-25	1050-1750	436.5	2.4-4
Zinc Phosphide Zn_3P_2	1:50	40-75	2800-5250	567	5-9
Barium carbonate $PaCO_3$	1:5	400-1480	28,000-103,600	5670	5-18
Arsenious Oxide As_2O_3	1:33	1-140	70-9800	860	0.1-11.4
Strychnine $C_{21}H_{22}N_2O_2$	1:320	1-10	70-700	88.5	0.8-8
Red Squill $C_{36}H_{52}O_{13}$	1:10	100-600	7000-42,000	2850	2.5-15

* These figures are calculated on the assumption that many will have the same physiological response to these compounds as the animals on which it was tested.

** On the basis of data from monkeys. This extrapolation to man must be taken as a very tentative estimation due to the peculiar action of ANTU. The correct L.D.50 figure for man may be much lower.

In the coming Issues:

- **Ants and Their Control**
- **How to Identify and Control Roaches**
- **Squirrels Can be Pests**
- **So You Want to be an Arborist**
- **The House Mouse and Disease**

and Many Other Important Articles

Don't Miss a Single Issue of PESTS!

—BOOK REVIEWS—

HOW TO KNOW THE IMMATURE INSECTS

By Dr. H. F. Chu

"How to Know the Immature Insects" by Dr. H. F. Chu should prove to be an exceptional help to all who work with insects. It is the first illustrated key for readily identifying the growing stages of insects, to be published and fills a long-standing need.

This book is a member of the well-known Pictured-Key series and is written in that highly-usable style. The immature stages of all the important orders of insects are keyed to families and many individual species pictured and described.

Careful suggestions are given for collecting and rearing immature insects, together with important references and a helpful illustrated glossary.

"How to Know the Immature Insects," published this year has 234 pages and is illustrated with more than 600 careful drawings. It is available in cloth binding for $3.15 and in a spiral bound edition for $2.15 including postage and can be obtained through Pests and Their Control, money order or check with order.

INTRODUCTION TO APPLIED ENTOMOLOGY

By W. J. Baerg

"Introduction to Applied Entomology" acquaints the student with the more common insects. Injurious species and the useful ones are emphasized. It includes most of the important crop pests as well as the species affecting man and animals directly. Remedial and preventive measures are given as far as possible according to the results of most recent investigations.

This book is exceptionally well illustrated, attractively bound and neatly reproduced by easy-to-read photo offset.

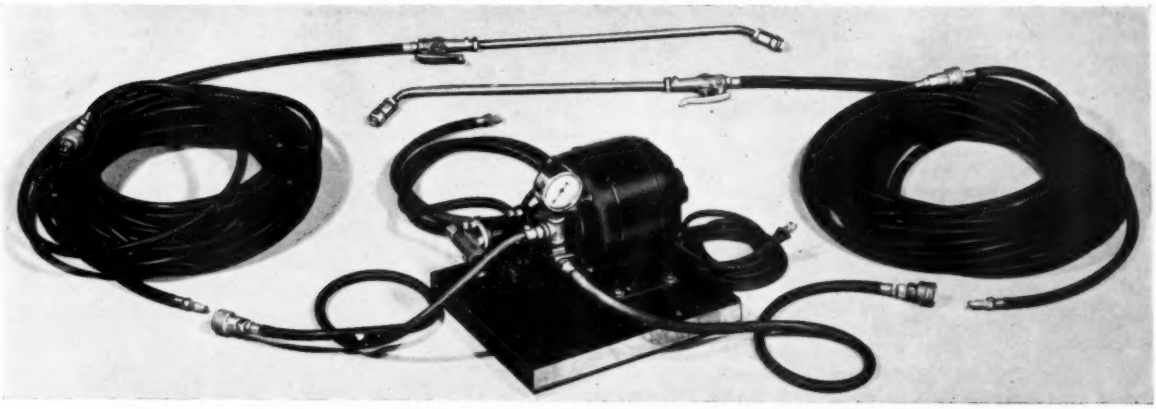
"Introduction to Applied Entomology" 3rd edition, published in 1949, contains 191 pages, and 208 illustrations, and can be purchased through this magazine for $4.15 including postage, cash with order.

Use them both!

Not one in each hand, of course, but use each of PCE's professional residual applicators on the job for which it's best suited.

They're designed and built for the PCO — and their built-in dependability and job ability means more profitable work done for you.

Order today — they're both in stock for immediate delivery.



PCE's Electric Residual Applicator . . . Practical, Portable, **Profitable.** For large scale work, indoors and out . . . for termite control. Shipped COMPLETE — ready to plug in and run. Guaranteed for 2 years.

COMPLETE UNIT . . . with 100 ft. PCE oil-resistant hose; 18" aluminum extension; valve; set of 3 residual fan pattern nozzles; 6' Underwriter approved cord; 5' intake hose; pressure gauge; high-precision gear pump; 110 volt 60 cycle AC motor (DC available on request) . . . Sensationally LOW PRICED AT ONLY $150.00 F.O.B., N. Y. C.

PCE's 2-qt. Residual Applicator—the Perfect Portable Sprayer — continues the favorite of PCOs everywhere. From its all-brass tank to the leak-proof swiveling removable angled nozzle extension, it's the finest unit of its type in use today.

List price only $36.00 each, F.O.B., N.Y.C. Discount to the PCO trade 33 1/3%. Additional 10% discount in lots of 12.

PCE

PEST CONTROL EQUIPMENT CO.

47 WEST 43rd STREET **VAnderbilt 6-5390** **NEW YORK 18, N. Y.**

WHAT TYPE FORMULATION SHALL I USE?

by

W. E. McCauley

Julius Hyman & Co.

☆

AN INSECTICIDE has been described as a substance which kills an insect by its chemical action.

Insecticides may be grouped roughly into those that (1) kill when taken internally; (2) kill by external contact as a liquid or a solid; or (3) those that kill as fumigants — in other words, applied to the insect in the form of a gas; and (4) a combination of the above (this latter concept has developed recently and will not be found even in texts which are five years old or older.)

For purposes of this brief discussion, I will confine my remarks to the application of insecticide formulations commonly used to control household, industrial and institutional pests and related arthropods. I will further restrict consideration to contact insecticides in the broader sense (including those which manifest "proximal" or local vapor toxicity).

Other factors being equal, pest control operators are primarily interested in the use of the most "*convenient*" type of formulation and we may as well recognize that what is "*convenient*" for one PCO may not be "*convenient*" for the other. Hence, we should limit our thinking to those basic concepts which affect or influence the action or performance of a given formulation against pests which we are trying to control.

Definition of Terms

First let us consider a few definitions and terms commonly thought about but seldom defined.

1. *A liquid*: A liquid is a substance which flows freely; it is characterized by *free movement of the constituent molecules* among themselves but without the tendency to separate from one another as in the case of gases.

2. *A solution*: A solution is a homogeneous mixture of a substance (solid, liquid, or gas) in a liquid; solutions are typically liquids.

3. An *emulsion*: An emulsion is, typically, a suspension of a liquid within a liquid where the two are not soluble; examples are milk, cod liver oil, and most PCOs are familiar with insecticide emulsions.

4. A *suspension*: A suspension is a finely divided solid dispersed in a liquid or a gas.

5. A *dust*: A dust consists of fine, dry, pulverized particles of a solid. (Note that in many respects a dust approaches the physical properties of a liquid).

6. A *wettable powder*: A wettable powder is a dust treated chemically to facilitate rapid wetting of all surfaces by water.

In modern pest control operations, it is exceptional if the pest to be controlled is in sight — rather, PCOs usually fight an unseen enemy (at least, in part). Application is most often made with the knowledge that if a given species is present it will most likely be found in the areas treated. In other words, we lay down a "chemically lethal environment" (to borrow from the language of the chemical warfare personnel).

The tenure (duration of exposure) of our intended victims in the treated environment has an important bearing on the nature of the formulation we should use *and upon the results obtained.* If we can depend upon the pests remaining in the vicinity of or directly upon the treated surfaces, the type of formulation is not so important. However, when we are treating a given environment in the hope of destroying insects which may come into that environment for a short period of time, it becomes increasingly important that we give consideration to the use of a formulation which will readily adhere to attach itself to the body of the pest in question. *It is for this particular type of pest control operation that I believe properly formulated dusts are superior to any type of liquid application,* regardless of whether we wish to use an oil solution or an emulsifiable formulation. In other words professional appliers should get better results with liquids than amateurs simply because they know where the environment of the pest is and hence know *where to apply.*

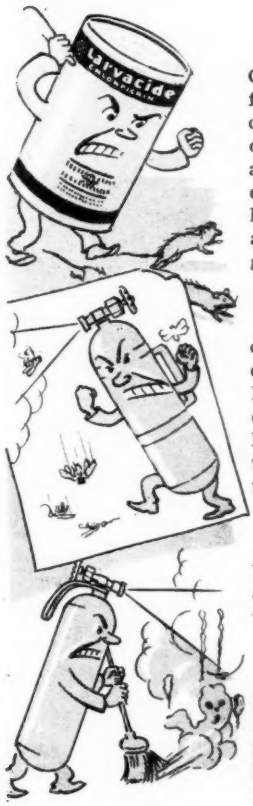
Dust vs. Liquids

Here are some specific examples. Some of the most common insects of which control is attempted in this manner are the American and Oriental roaches, the silverfish or fire brat, and many types of ants which are referred to as "occasional invaders."

Because of the particular habits of these species, we often fail to apply the insecticide to the immediate environment in which these species thrive. We too often try to control these pests by what I term a "barrier action." We lay down a narrow band of insecticide through which we hope the invading pests will travel and thereby be destroyed. This same type of treatment has been resorted to in agriculture by laying dust barriers alongside corn fields to prevent the migrating nymphs of chinch bug from entering the corn fields as they leave small grain in certain seasons of the year. It is easy to see why an insect crossing a dust barrier is more apt to pick up and carry with itself a lethal dose of an insect toxicant, whereas the same insect could readily cross a narrow band of a solid crystalline chemical or waxy chemical without picking up a lethal dose of the toxicant. This can easily be demonstrated by releasing roaches or other insects inside a circle consisting of a half-inch band of a sprayed surface or a half-inch band of a satisfactory powder. At the end of 24 hours, among the insects which have crossed the dust barrier almost 100% mortality will have resulted (provided a satisfactory formulation of a suitable toxicant is used), whereas most of the insects which crossed a sprayed surface (one-half inch wide) will be unaffected. I would like to emphasize that I am not recommending the use of dust for general pest

There's profit

for PCO's in these ISCO PRODUCTS



PCOs recommend LARVACIDE, the penetrating tear gas fumigant, for sure cure of rat control problems. The handy one lb. cans of LARVACIDE are standard equipment wherever they go, for they never know when they'll need this all-around, fast-acting fumigant.

Building fumigation for rodents with LARVACIDE can be done with light dosages — ¼ lb. per 1000 cu. ft. or, in some cases 2½ lbs. per 1000 sq. ft. LARVACIDE drives rats out of their hiding places to die on the open floor.

Carry the SURE cure on YOUR jobs — in handy one-lb. cans. It's the can that says 'can-do' to rat control.

No. 300 **DDT Iscomist** — 5 lb. Bomb containing DDT and Pyrethrum for quick, easy kill of insect pests. No. 316 **Pyrethrum Iscomist** — for use where DDT is not indicated.

ISCOMIST Aesosol Deodorizer — There is a clean profit in clean-smelling air! While you're on the spot on a PCO job, you can sell your customer on clearing and freshening the air with the new ISCOMIST Aerosol Deodorizer. This Deodorizer does NOT replace one odor with another — it actually kills the odor, thanks to magic Metazene! Takes only four seconds per 1,000 cubic feet. Excellent for offices, banquet rooms, hotel rooms, kitchens, hospitals, restaurants, lavatories, stores, funeral parlors, trains, theaters — where odors are a problem.

INNIS, SPEIDEN & CO.

117 LIBERTY ST., NEW YORK 6, N. Y.

Boston Cleveland Cincinnati Philadelphia Chicago Omaha

Spread and Power

Effective pest control requires wide spread of insecticide and the driving power to force it into every crack and crevice—under mouldings, behind baseboards, around plumbing, between cases and bales.

MISTMASTER Ball Bearing Fan Type Sprayers have both the spread and the power to do a quick, thorough job. Driven by 1/3, 3/5, or 1 hp. motors, they spray insecticides for distances as far as 40 feet, penetrate into hard-to-reach places, and spray large areas quickly, completely.

Here is a sprayer that has more power than any other portable sprayer, yet is convenient and easy to handle. Equipped with 1-gallon non-corrosive tank, driven under low pressure with a high volume of air, it can be used with any type of insecticide, either oil base or water base, and carries insecticides into remote openings in full volume and power.

Used anywhere, it plugs into any electric outlet, and is supplied with three nozzles for fine, medium, or coarse spray, can also be furnished with 2-gallon tank and special nozzles or in special design to meet individual requirements.

WRITE TODAY for further details and complete specifications or mail the coupon.

SPRAYER CORPORATION OF AMERICA
1700 Payne Street, Evanston, Illinois

☐ Send complete information on MISTMASTER Ball Bearing Fan Type Electric Sprayers
☐ We are interested in details of your dealer franchise.

Name _____

Address _____

City _____ **Zone** ____ **State** ____

Sprayer CORPORATION of AMERICA

1700 PAYNE STREET, EVANSTON, ILL.

control work for the simple reason that, due to the matter of convenience, dusts are unsightly and certainly not to be desired where treating insects known to be present or an environment where insects are known to spend their time. Rather I would recommend that PCOs use liquid formulations effectively. Furthermore, the diluent of a dust formulation remains unsightly until removed, whereas the carrier — diluent of liquid formulations — volatizes, leaving behind little or no evidence that an application of insecticide has been made. As insect toxicants become more potent (requiring less and less actual chemical deposit for effective control), the possible neatness of pest control work becomes enhanced.

One of the best examples which we have seen and which serves to emphasize the important function of a dust over a spray has come to light in the field of agricultural pest control. Fields of alfalfa treated with an insecticidal dust have been found to be lethal to honeybees for many days following dusting where similar amounts of insecticide applied in the form of an emulsion to alfalfa fields have been shown to be almost entirely harmless to honeybees grazing in such fields following application. The explanation, I believe, of this phenomenon lies in the fact that the honeybee which touches the plant surfaces but very lightly picks up sufficient of the insecticide dust to cause mortality, whereas the honeybee can brush lightly against surfaces sprayed with a similar toxicant in liquid form without picking up a lethal dose.

The essence of the problem revolves around the fact that insects that are present directly upon treated surfaces in the area of an insecticidal treatment but for a very short time must be capable of picking up mechanically a sufficient amount of the lethal toxicant and this is best accomplished on surfaces where lethal dust is present.

I am sure there is active interest among PCOs concerning the superiority of emulsifiable formulations over oil solutions or of oil solutions over emulsifiable formulations. I would simply like to list what I consider the advantages and disadvantages for each formulation. I have done this rather carefully, myself, and find that there is much to be said for the use of both types of formulation and I would like very much to see the pest control industry continue to use both oil solutions and emulsifiable formulations in situations where liquid sprays are possible, using the type best suited to the given job at hand.

ADVANTAGES OF EMULSIONS

(Disadvantages of oil solutions)

1. Less penetration porous surfaces than oil (usually an advantage; not always.)
2. Logistically sound—dilute on job.
3. Ease of varying concentration.
4. No odor problem from solvent oil.
5. Better wetting of moist surfaces than with oil.
6. Much less fire hazard than with most oil solutions.
7. Less hazardous to operator due to presence of large percentage water which is less toxic than kerosene either dermally or in the lungs.
8. Much more versatile; can be used on plants, pets, as well as in buildings.
9. Less harmful effect on asphalt floors, varnished surfaces, leatherette finishes, etc.
10. Usually less repellent than oil solution. Better for ants and comparable forms.
11. Less tendency to mist into very fine particles.
12. Usually somewhat cheaper than oil solutions.

ADVANTAGES OF OIL SOLUTIONS

(Disadvantages of Emulsions)

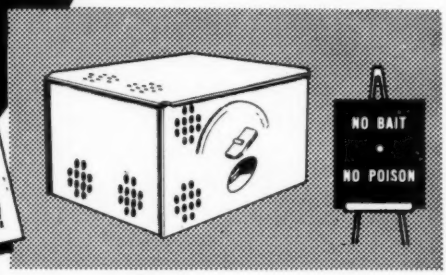
1. More corrosive to equipment and to treated surfaces of machinery. Daily washing of some equipment desirable.
2. Less rapid in action than oil.
4. Subject to stratification by standing in sprayer overnight (not true for all types.)
5. More apt to be mixed improperly by workmen on the job.
6. Little penetration property; hence, not good for powder post beetle or other insects where penetration is absolutely essential.
7. More subject to nozzle clogging due to formation of flock or insoluble residue.
8. Deposits formed from same types of emulsions more subject to removal by washing (not true for all deposits—easily determined by glass plate test under faucet.)

The use of wettable powders as a feasible form of insecticides for routine pest control work will not be covered here inasmuch as I believe they are not adaptable for use in hand equipment which is *not* constructed to maintain agitation of the spray solution during normal spray operation. In power equipment, of course, where agitation is available, wettable powders are often used.

The chief advantage of the wettable powder over the emulsifiable formulation is found in the fact that in formulations of wettable powder practically none of the insect toxicant penetrates the surface on which it is applied. This is of maximum advantage where residual toxicity with maximum duration is desirable as in the case of DDT or Chlordane for fly control. Wettable powders are also widely used in the animal spraying field, in view of the fact that it has often been felt that crystalline toxicants are less apt to prove harmful to the animals when applied in this form as contrasted with their application in the form of emulsifiable products where the toxicant is in solution dispersed through the water carrier.

I would like to reiterate that the chief advantages of convenience of the liquid formulations over the dust lies in (1) the fact that there is no objectionable residue resulting from most uses of a liquid formulation as is the case where a dust formulation is used. The carrier in a liquid or fluid formulation is a volatile material which disappears in a day or so after application, whereas, the carrier in a dust formulation is usually a non-volatile, solid material which causes an unsightly residue which remains until mechanically removed by sweeping, dusting or vacuuming the treated surfaces; (2) Unfortunately, the toxicant may also be removed by the same operation that removes the carrier. These factors, plus (3) the greater persistance of the toxicant deposited by the spray method, explain the trend away from dusts and toward liquids made possible by the advent of DDT and Chlordane. The professional PCO should seldom have to resort to the use of powder to get results. As explained earlier, an inexperienced

STAR PERFORMER



The Trap You Will Swear By --Not At!

automatic

KETCH-ALL MOUSE TRAP

No Bait — No Poison
Catches 15-20 Mice with One Setting.
Safe — Sanitary — Effective
Minimizes Chance of Rodent Hair Contamination.

Economize with the best, specify KETCH-ALL traps. The modern effective trap. Special PCO trade price $32.00 doz. prepaid. Retail $4.50 each.

DONT' DELAY . . . ORDER TODAY

Ketch-All World's Finest Mouse Trap

ALBIA PRODUCTS CO.

One East 42nd St., New York 17, N. Y., MUrray Hill 7-3766

Farnam PORT-A-SPRAY

World's LOWEST PRICED "Portable" POWER SPRAYER

101 USES!

- SPRAY insecticides, fungicides, weed-killers, disinfectants
- SPRAY gardens, lawns, trees, shrubs, livestock, buildings

USE ALSO AS A "Portable"

- FIRE FIGHTER
- WATER PUMP
- POWER PLANT

This "Mighty Mite" at a sprayer shoots a driving stream up to 25 feet, or adjusts to a fine mist. Sprays a gallon-a-minute at pressures up to 150 lbs. Weighs only 75 lbs. Only 18 inches wide. Wheels like a baby carriage! Works like a charm!

WRITE for Illustrated Literature and 10 DAY TRIAL OFFER!

FARNAM EQUIPMENT CO.
Dept. 370 OMAHA 3, NEBRASKA

THE WISCONSIN ALUMNI RESEARCH FOUNDATION

offers the services of its

INSECTICIDE TESTING LABORATORY

for the Biological Evaluation of Agricultural and Household Insecticides

Included in our services are: evaluation of proprietary insecticidal materials, determination of the potency of proprietary agricultural dust and spray materials, fungicidal and bactericidal evaluations, warm blooded toxicity studies and screening of unknown compounds.

Write for Details

THE WISCONSIN ALUMNI RESEARCH FOUNDATION

P. O. Box 2059 Madison, Wisconsin

individual may get better results from the use of powder. *But the only place where dusts still maintain an advantage over liquid formulations is where the maximum amount of insect toxicant must be picked up quickly by the insect.* For this purpose dusts are still superior to liquids.

These remarks are directed toward "structural" pest control work and may not necessarily be true for exterior situations. They do not apply to the agricultural field.

Pest control operators must bear in mind that their routine work is sufficiently complex to justify the use of all types of formulations. Just as a champion boxer must utilize his right and left, as well as clever footwork, all the while keeping a sharp ear bent toward the trainer's corner, so the successful pest control operator must depend upon headwork to use the best tools possible for the most effective end result.

Pigeon Trouble? Rats, Too!

Hordes of rats, nourished by food put out for pigeons, have undermined the Moses Cleaveland statue and a large section of the southwest corner of Public Square, in Cleveland, Ohio.

Properties Director A. L. Munson said the situation is so bad, in that part of the Square, that danger of a cave-in exists with subsequent injury to pedestrians.

He said the rats have burrowed so deeply and extensively that a cave-in could bury persons up to their waists. He sent George C. Petri, city rat exterminator, to examine the rat tunnels under the monument and ordered him to pump cyanide gas into them to exterminate the rodents. The gas will be used at an early morning hour before the rush hour crowds fill the Square.

Munson also pointed out that Eastman Park, just east of Public Library, has become rat infested because of food dumped there for pigeons.

Meanwhile, Parks Director Sam Newman anounced he will seek legislation in the next council meeting to forbid feeding of pigeons.

Newman drew fire from pigeon fans when he admitted poisoning them at the Cleveland Lake Front Airport, where he said they constitute a hazard to human life by flying into the path of planes. More than 100 pigeons were found dead in the Square in one week.

Munson said investigation has shown some persons go to markets early in the morning and collect refuse and leavings — sometimes in bushel-basket quantities — and dump it on Public Square to feed the pigeons.

This, he said, has resulted in the increase of the rat horde in the Square to make it "the worst rat-infested area in the city."

Fly Control Chemicals and Toxicities

(from page 14)

means that city-wide campaigns are necessary just as they were in 1946 and 1947 when the program was at its height of effectiveness. It also means that screening and other mechanical methods of keeping flies out of buildings will have to be used. Unless cooperation is secured, isolated contracts with groceries or markets or restaurants will not solve the problem.

If emphasis is to be placed on killing larvae rather than adult flies, what chemicals can be used effectively? With all that has been said and written about chemical resistant strains of flies developing, in general this information has dealt with the resistance of adult flies. Since we have suggested that the breeding places for flies be given more attention, what is the picture regarding the use of the chemicals mentioned above for controlling fly larvae? Work done by the military during the war showed that DDT was not especially effective against fly larvae, but that it did kill the flies as they emerged from the pupal stage. In direct contrast to this, it is known that chlordane, toxaphene, benzene hexachloride and other of the newer chemicals are effective fly larvacides. They may find use this year. The manufacturers of these products should be able to furnish information on how to use their products as larvacides, and the reader who wants such information is urged to write the manufacturers as well as State Experiment Stations and the U. S. Department of Agriculture.

That sounds like a nice way to solve the problem, but it isn't that simple. Many of these residual chemicals will be useful on garbage dumps or other areas where the material to be sprayed will not be used to feed animals or will not be later applied to soil used to produce food. But some of these residual materials do not break down in the soil as readily as might be expected, and their use may be restricted for that very reason. Furthermore, materials like BHC possess an odor, and that too may limit where it can be used.

I am going to stick my neck out and make some predictions for 1949. I believe the chief chemicals to be used as fly larvacides in 1949 will be Methoxychlor, Chlordane, Toxaphene and BHC. I believe the chief chemicals to be used as residual sprays inside buildings will be DDT, Chlordane and piperonyl butoxide-pyrethrum mixtures. Where food products are involved such as in bakeries, groceries, dairies, restaurants etc., I believe the piperonyl butoxide-pyrethrum mixture will come into greater prominence; but unless restrictions are applied, I believe considerable quantities of Chlordane, DDT, and Methoxychlor will also be used. Naturally, with all of these materials, intelligent application is important. Where Grade AA sprays are involved and residual action is not required, Pyrethrum, Lethanes and Thanite will be the chief products used.

Above all, I believe if 1949 is to see good fly control, it will be necessary to stress proper sanitation, cooperation between client and pest control operator, distribution of better factual data by various agencies, proper use of mechanical barriers (screens etc.) and the intelligent use of the chemicals available for fly control purposes.

Make Money With CUSTOM Spraying

Custom Spraying is a profitable business on either a full or part-time basis. Kill weeds; protect shade and fruit trees; sanitize barns, poultry houses; rid homes, farms, resorts of insect pests; spray livestock; whitewash. These are just a few of the jobs that a Custom Sprayer can do profitably with John Bean specialized sprayers.

Pest Control is in the News

Hundreds of communities know that spraying rids them of insect pests. You can interest men in starting a Custom Spraying business, or open a Custom Spraying service in your own organization. John Bean has a free Custom Spraying Manual that tells how to get into this business — what the big demand is for this service. Write, or use coupon today.

There's a John BEAN Sprayer for Every Need

John Bean has the complete line of sprayers:

- output from 3 to 60 gallons per minute
- pressures all the way to 600 lbs.
- models can be skid mounted, trailer type, or small portable unit.
- engine powered or power take off
- complete accessories

JOHN fmc **BEAN**
LANSING 4 MICHIGAN

Division of Food Machinery & Chemical Corp.

Send for interesting manual, yours free. See coupon below.

John Bean Lansing 4, Michigan

Send free Custom Spraying Manual No. 72 that outlines advantages of Custom Spraying business.

Name _____

Address _____

City _____ State _____

New FARM SPRAY GUIDE FREE! Write for your copy. Tells what, when, how to spray!

M·S·A: PROTECTION HEADQUARTERS *for the* PEST CONTROL OPERATOR!

M.S.A. supplies the safety equipment you need for dependable protection in pest control on the job . . . developed by intensive research and quality—built by the world's largest manufacturer of approved safety products. You're sure of safe performance and top wearing comfort when you specify M.S.A.—all the way!

M·S·A CHEMOX* OXYGEN BREATHING APPARATUS

Self-generates oxygen as you breathe, using replaceable canister! Respiratory safety in *any* gaseous or oxygen-deficient atmosphere.

M·S·A DDT RESPIRATOR

Replaceable twin chemical cartridges prevent inhalation of DDT and DDT solvents or carriers. Easy-fitting facepiece.

M·S·A HCN GAS MASK

Protects against HCN concentrations wherever enough air is present to support life. Long-lasting, replaceable canisters.

M·S·A DUST RESPIRATOR

Popular M.S.A. Comfo and Dustfoe models provide ALL-DUST breathing protection, with inexpensive throwaway filters.

M·S·A GAS TIGHT GOGGLES

Keep gases, mists and irritating dusts out of eyes. Non-fogging water chamber design.

M·S·A FEND HAND CREAMS

When rubbed on the skin, provide protective barrier against irritants. Easily washed off after work.

M·S·A FIRST AID KITS

Unit-packaged first aid treatments, ready for instant use. Dust and moisture-proof steel cases.

Write for descriptive Bulletins on these outstanding M·S·A Products!

*Trademark Registered

MINE SAFETY APPLIANCES CO.
BRADDOCK, THOMAS AND MEADE STREETS
PITTSBURGH 8, PENNSYLVANIA
District Representatives in Principal Cities

Latest Report on Fly Control

(Continued from Page 7)

flies are under study in the laboratory, As shown by LD_{50} values obtained with a special microsyringe apparatus, strains can be developed which are more or less specifically resistant to one chemical or group of closely related chemicals. Thus we have DDT resistance, chlordane resistance, Pyrenone resistance, etc., strains of houseflies differentiated.

We will consider here only two DDT resistant strains, since it is the resistance that attracts the most attention. Two strains of resistant flies in the laboratory showed that one tolerated approximately 20 times that of the laboratory strain and the other 100 times. Do not confuse resistance with immunity. Even with the most resistant strains we were unable to rear flies through one generation in a screen box in which only one side or 1/6 of the area was treated. About 8,000 to 10,000 pupae were placed in this screen box over a period of three months after a treatment with DDT and no eggs have as yet been laid.

Solvent May Extend Life of Residue

The resistant flies exhibited not only a high tolerance for DDT, but also for *Rhothane D-3*. A small amount of tolerance was present for *Methoxychlor*. No practical amount of tolerance in the DDT resistant flies has been exhibited for chlordane, *Heptaklor*, *Toxaphene*, *118*, *497*, *Pyrenone*, or BHC. This makes possible quite a number of insecticides that might be substituted for DDT in the control of resistant flies; however, it must be kept in mind that of these materials, only *Toxaphene* and *497* show any long-lived residual action. If one uses a solvent with a low vapor pressure, one can extend the residual life of chlordane, BHC, *Pyrenone*, *118*, and *Heptaklor*. In other words, the low volatility of the solvent can materially slow down the loss of toxicant. With a low boiling solvent, you could expect about one month's insecticidal activity for the residues of the materials just mentioned. *Methoxychlor* should be effective for about four to eight weeks. *Toxaphene* or *497* would probably do a good job for three to six months depending upon accumulation of dust and other environmental hazards.

Further study with the resistant flies has shown by several reciprocal crosses of susceptible and resistant flies, that resistance is neither dominant or recessive, but rather than being a gene characteristic is probably a cytoplasmic characteristic. Such cytoplasmic characteristics are usually long enduring changes. Thus in a highly purified resistant strain, such as the one that we have which is 100 times as resistant as the laboratory strain to DDT, no significant change has occurred in their resistance through 17 generations. However, in the strain which possessed 20 times the resistance of the laboratory strain, a considerable loss of DDT resistance was noted in six generations. This might indicate that eventually, if the use of DDT is abstained from, the resistant flies may disappear. Another factor which may influence the disappearance of resistant strain flies is that their total development time from egg to adult appears to be one to two days longer than the laboratory strain. Under field conditions, these particular flies would be expected to disappear when in competition with flies of a shorter life cycle.

A mechanism which appeared to be protective for the resistant flies was that, with high dosages of DDT, their rate of knockdown was just as fast if not faster than the laboratory strains but their percentage mortality in the down flies was very low. In fact, in the laboratory where about 98 percent knockdown was obtained for both the DDT resistant and the laboratory strains in 60 minutes, 87 percent of the resistant flies recovered in 24 hours. All the laboratory strain flies died.

On surfaces possessing a small amount of available DDT, the knockdown rate of the resistant flies was much slower than that of susceptible ones.

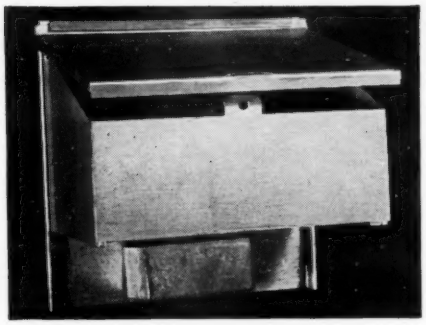
Besides the chemical resistance there may be changes in structure and in habits of the flies which prevent some from being poisoned by DDT. Some observations might suggest a change in habits of flies persisting upon treated premises. In certain of our treated barns, it has been observed that houseflies were no longer resting upon the treated walls or ceilings, but were preferring to rest on the floor or on the animals.

Other factors altering the effectiveness of residual insecticides may be attributed to the surfaces or the environment. Studies of residues on concrete, whitewash, and painted wood surfaces, indicate a much reduced residual life. Apparently the alkalinity of the concrete and whitewash decomposes the DDT residue. On painted wood, the DDT is absorbed and retained unless, of course, the solvent capacity of the paint is exceeded. If this is done you will obtain a bloom on painted surfaces which is quite effective. Certain elements in the environment such as dust, solar radiations, rain, and wind can materially shorten the longevity of residues.

Termite Reports Available

"An International Termite Exposure Test-Twentieth Progress Report" by George M. Hunt and Thomas E. Snyder has just been issued and is available from the American Wood-Preservers' Association, 111 West Washington, Chicago 2, Ill. This is an annual report on cooperative tests begun in 1928 to compare the effectiveness of various preservatives in protecting wood against decay and termites in the Canal Zone, Australia, Hawaii and South Africa.

Circular No. 683, "Effectiveness of Wood Preservatives in Preventing Attack by Termites" is available from the Supt. of Documents, U. S. Government Printing Office, Washington, D. C., for ten cents. This 24-page booklet goes into detail on ways to preserve wood and the chemicals that can be used.



RODENT CONTROL STATION

6-12 stations $2.00 each
12 or more $1.75 each

MICE-GLUE

GETS MICE LIKE FLYPAPER GETS FLIES
7½ lbs. $5.00 25 lbs. $13.50 100 lbs. $45.00

BIRD-REPELLENT

Keep Pigeons, Starlings and Other Birds from Buildings
7½ lbs., 75c lb. 25 lbs., 65c lb. 100 lbs. 60c lb.

PEST CONTROL CHEMICALS CO.

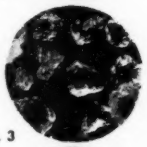
324 BROADWAY WRITE FOR DETAILS BUFFALO, N. Y.

SOLVAY

TRADE-MARK REG. U. S. PAT. OFF.

Para-dichlorobenzene

No. 1


No. 3

No. 6

No. 9

FOR PURITY

FOR UNIFORMITY

FOR QUALITY

Specify
SOLVAY PARA-DICHLOROBENZENE
. . . available in four grades

SOLVAY SALES DIVISION
Allied Chemical & Dye Corporation
40 Rector Street, New York 6, N. Y.

USE LIONS IN YOUR BUSINESS?

IN CAESAR'S TIME,

a lion skin was put in the trunk along with the winter togas to "scare away" the timid moth and carpet beetle. Larvae must have caught on, since the same trick won't work today.

TODAY, the PCO is using RESIPROOFER to prevent moth damage, since,

. . . . . RESIPROOFER does not alter the appearance or feel of any woolen fabric.

. . . . . RESIPROOFER combines with animal fibre like a dye—once applied, it protects fabrics even after successive soap and water washings and dry-cleanings.

. . . . . RESIPROOFER is odorless, fast to perspiration, light, and cannot be worn or brushed off.

RESIPROOFER is sold only for application by the professional pest control operator. If the possibilities of this mothproofer strike your imagination, just ask for additional information.

RESIDEX
CORPORATION
FOOT OF CENTRE STREET, NEWARK (2) N. J.
PHONE, MARKET 3-0566

CONTROLLING FLIES WITH BHC

Abstract of an article which appeared in
Agricultural Chemicals, April 1949

LABORATORY and field studies launched by the Division of Entomology of California Citrus Experiment Station, Riverside, have shown that the primary cause for failures of DDT residual sprays to accomplish satisfactory fly control in Southern California areas during 1948 has been the development of fly resistance to DDT and related materials.

Samples of natural housefly populations were collected from various areas of California, including Bellflower, San Jose, Ontario and Riverside, and their reared progeny were compared by laboratory tests with a strain of houseflies which has been bred in captivity for several years, having never been exposed to DDT.

The residual tests which followed, using ten adult female houseflies in each test with four replications, demonstrated a marked resistance of the Bellflower strain of flies to DDT. This strain is also somewhat resistant to methoxychlor, but is not appreciably resistant to gamma-benzene heachloride or to chlordane compounds.

Injections of DDT-acetone solutions directly into the bodies of the flies through the cervical region showed the same degree of resistance in all the fly strains as shown upon external application, thus demonstrating that the resistance is not caused by the failure of the DDT to penetrate the fly cuticle. To date this enormous resistance of the Bellflower strain has been maintained over 15 generations bred in the laboratory completely free from contact with the DDT.

In order to make rapid progress in providing adequate substitutes for DDT in fly control, field studies were begun in the summer of 1948 with a member of synthetic insecticides.

Methoxychlor.—Trials with this material have in general proved much more satisfactory than those with DDT. When application was made at 40 pounds of the fifty per cent wettable powder per 100 gallons of spray (approximately 2.5 per cent), excellent fly control was obtained. The period of effectiveness varied from one week to one month. The situations where his material proved ineffective were directly correlated with flies definitely resistant to the chemical. Methoxychlor produces a more rapid knockdown than DDT and typically gives a more impressive performance. It is only about one-fortieth as toxic as DDT to warm-blooded animals and is thus considered safer to use. Its use in areas where flies are extremely resistant to DDT is likely to result in poor fly control.

Toxaphene.—This material was applied at 50 pounds of 40 per cent wettable powder per 100 gallons of spray (approximately 2.5 per cent). Its use resulted in good initial cleanup but reinfestation was rapid. Toxaphene produces a slow knockdown (about 3 times slower than DDT) and had only about one-tenth the toxicity of DDT to non-resistant flies.

Chlordane. — This material was applied as a 40 per cent wettable powder at 50 pounds per 100 gallons of spray (approximately 2.5 per cent. The initial clean-up was excellent and in some cases residual action lasted up to one month In other cases, however reinfestation was very severe after one to two weeks. The rate of fly knockdown by chlordane is slower than that of DDT.

Benzene Hexachloride. — Early tests with benzene hexachloride wettable powders showed so much promise that the material was given extensive trials during the summer and fall. This material produces a rapid fly knockdown, about five times as fast as DDT, and therefore gives more impressive results even on none-resistant flies.

Used as a wettable powder at a concentration of 0.25 per cent gamma-isomer, the initial cleanup was nearly perfect and pronounced residual action was observed for three weeks to one month during the hottest summer weather and for up to two months during cooler fall weather. During these periods the treated premises remained almost free of flies. Benzene hexachloride wettable powders are generally available containing 6 per cent, 12 per cent, or 25 per cent gamma-isomer. The 0.25 per cent dosage may therefore be obtained by using 34 pounds of the 6 per cent product, 17 pounds of the 12 per cent product, or 8 pounds of the 25 per cent product per 100 gallons of spray. The 6 per cent gamma-isomer product is produced from an unrefined benzene heachloride and possesses a sharp and disagreeable odor and is irritating to the nose and eyes while spraying. It should be used with caution around dairies, homes, and other places where odor might be objectionable. The 12 per cent gamma-isomer wettable powder is produced from a partially refined benzene hexachloride and has less odor and irritant properties. This product has been used in more than 150 dairies in Southern California with highly satisfactory fly control, and no complaints have been received as to odor.

Benzene hexachloride should not be used in milk rooms or around open milk containers because of the possibility of imparting disagreeable odor to the milk. Where an odorless and non-irritant treatment is desired, as in dwellings, the 25 per cent gamma-isomer wettable powders made from purified gamma-isomer may be used. These products are considerably more expensive than the 6 or 12 per cent gamma-isomer wettables and do not appear to possess quite as long residual action.

Miscellaneous materials. — Experimental sprayings have been made with a combination of pyrethrins and piperonyl butoxide. This combination was highly effective against the flies on initial contact, but did not have adequate residual action at economical dosage levels. The new compound "118" used at 0.25 per cent as wettable powder has given promising results in limited tests, but the extent of its residual action has not been adequately tested.

To Kill Water Weeds

A recent discovery of the departments of Agriculture and Interior promises to save money in keeping down flow-retarding weeds in irrigation canals and other bodies of water. The experimenters found a petroleum naptha is an effective weed-killer and it costs only about one-tenth as much as other chemicals which have been used for this purpose.

AN EXTRA PROFIT MAKER FOR YOU!

SELL THIS low-priced sprayer for EXTRA PROFIT on Small Jobs

BURGESS vibro-sprayer
Pat. Applied For
No Motor, Compressor or Other Equipment Needed!

Pest control operators everywhere are learning how to make a good thing out of unwanted service calls on jobs too small to handle.

SELL THE VIBRO-SPRAYER!

The handy Vibro-Sprayer is just right for home-owners and operators of tourist camps, restaurants, taverns, small stores, apartment buildings, etc. Urge them to buy the electric Vibro-Sprayer to control pests. There's a big profit on your sale of the sprayer—afterwards you sell your own liquid mixtures for added profit.

SPECIFICATIONS

No air pressure required. Molded phenolic pump housing. 25 oz. Mason jar type paint container. 8' extension cord. Operates on 110-125 volts, 50-60 cycle, A.C. only. Dimensions: 8⅜" high, 6¼" deep, 4" wide. Weight: Unpacked, 2½ lbs. In single carton, 3¼ lbs. Packed 6 per shipper, 20 lbs.

ORDER A TRIAL STOCK TODAY

LOOK AT THESE PRICES!

Quantity	Your Price	List Price	Your Profit
1 Sample Unit	$9.75	$12.95	$3.20 each
2 to 5	8.65	12.95	4.30 each
6 to 23	7.80	12.95	5.15 each
24 to 47	7.15	12.95	5.80 each
48 and up	5.85	12.95	7.10 each

BURGESS BATTERY COMPANY
HANDICRAFT DIVISION
711 RAND ROAD, LAKE ZURICH, ILL.

"TOX-EOL"
for TERMITE CONTROL

Backed by 15 Years Effective Use

FOR WOOD AND SOIL TREATMENT

PRACTICALLY STAINLESS!

NO LASTING ODORS!

Available in a 12½ to 1 Concentrate

Advertising and dealer cooperation furnished contract agents including a 5-year warranty. We only have a few open territories but yours might be open. Write today for details.

CRE-O-TOX CHEMICAL COMPANY

Pioneers in the use of chlorinated phenols for termite control.

Broad St. at Union R. R. | Box 5218 | Memphis (12) Tennessee

WHAT MAKES BETTER HOSE?

Better hose, at least for the PCO, should be long-wearing, light, oil-resistant inside and out, kink-resistant, flexible, and safe.

PCE's superior hose for the PCO is all these things and more. It has a bursting pressure of 1500 lbs. and a working pressure of 250 lbs. It is stocked for immediate shipment. It is branded with the PCE signature for ready identification.

And it's economically low priced at only 23 cents a foot (33 cents a foot in less than ten foot lengths). Available in ¼" I. D., in any lengths, with or without fittings.

And PCE's lightweight aluminum extensions are equally good buys.

PCE's own exclusive special fittings provide LEAK-PROOF attachment of wands to applicators . . . to each other . . . or to nozzles — WITHOUT THE USE OF TOOLS. ⅛" I.P.S., threaded both ends, straight or angled, available in multiples of 1½ ft. 6 ft. angled end . . . $2.25. 18" wands . . . $1.25 Other lengths priced proportionately.

Pest Control Equipment Co.

47 West 43rd St. New York 18, N. Y.
VAnderbilt 6-5390

COMMENTS by the Editor

Grab 'Hold

NOW THAT we're getting back into a buyers' market, the identity of professional PCOs as a group is more important. With Mr. Consumer buying a little more cautiously than he did in the money-come-easy days, he's looking for dependable work performed by trained personnel. The label "PCO" must set aside men of this industry as specialists. The true meaning of that label should be broadcast to discourage the Jack of all trades who sees an easy buck in pest control work.

A united effort, through the National Pest Control Association, will make wider public relations possible. The NPCA can gain added meaning if this association's present work is augmented by the support of more PCOs. With increased membership, and the resulting increased financial support, the NPCA can embark on a public relations program to sell sound pest control to the public on a national scale. It can enable the association to broaden its educational and research program, to hire additional professional assistance for the benefit of all its members.

There is a job to do. PCOs have to ban together to educate the public in the important part pest control plays in our everyday lives. The best medium for this united effort is the National Pest Control Association, working on a *national* basis. Non-members can do well to grab 'hold of their industry responsibility and see what a membership in their own trade association can offer. The NPCA's address is 3019 Fort Hamilton Parkway, Brooklyn 18, New York.

Customer Cooperation

IN SOUTH BEND, Indiana, we've learned the Studebaker Corporation has prepared and is displaying throughout their showrooms and other buildings in that city a fine poster headed, "Wanted for Murder." Featuring the picture of two rats gnawing through feed sacks, the poster reads:

"Here are two of the most dangerous and useless creatures known to man. Wherever men live and work there is almost certain to be a rat problem sooner or later.

"Studebaker has declared war on these pests. A scientific job of extermination has been started in buildings where the problem is acute. It will be continued in an effort to safeguard the health of Studebaker workers and protect property which rats have been destroying.

"But the control of vermin won't succeed without your help. Let's keep this department clean. Use proper receptacles for disposing of left-over food at lunchtime. Clean out all waste materials that could be used for nesting, such as paper, sawdust, excelsior or cloth.

"Rats cannot live without your support . . ."

Elmer Kuntz, of Lien Chemical Co., writes, "This is to me, one of the most outstanding examples of customer cooperation I have ever known." We certainly agree that if more of the large plants PCOs are called upon to service would show similar cooperation, a better control program could be effected.

Congratulations go to the Studebaker and to their Mr. Carleton Shamos who developed the poster from material and photographs furnished by PCO Kuntz.

Mothproofing

WE OPENED our closet door the other day and to our complete surprise, to say nothing of the editor of *Pests*' reddened face, two adult moths flew past into another room. Maybe we were too close to the trees to see the forest, or maybe we thought modern science had developed materials that would not be attractive to moths. Anyway, control measurers were put into effect pronto.

We began wondering how many other people are not being as careful to see their clothes are fully protected from moths . . . how many PCOs are not taking advantage of this market. The need is there and good products are available to permit operators to give their customers satisfactory protection. Carpet beetles, too, can be controlled at the same time to round out a full program for the home. Can it be you, too, have been forgetting about mothproofing service?

Index

SOMETIME within the last three or four weeks, all of the subscribers to *Pests and Their Control* received an index to Volume 16 including the important articles which appeared each month during 1948. In the same envelope with the index is a penny post card listing a number of different subjects on which you might wish additional information. Through this survey, our editorial staff can be guided in making plans for future issues. Your cooperation in returning these cards to us promptly is earnestly requested.

And speaking of the penny post cards, you've probably discovered it contains a new word and a new kind of insect. There are Mice, *Houe*, and Confused *Flower* Beetles. Don't rush for your nearest entomology text, they're really unfortunate typo errors. The mice are the ones you find in the *house*, and the beetles are Confused *Flour* Beetles. This one's on our printer.

TERRATOX

1 to 4 formulations assure uniform solutions

The effectiveness of any formula for destroying termites largely depends on the *uniformity* of the solution. Due to a special scientific formula, the toxics in TERRATOX remain in suspension, assuring equal effectiveness *from every application.*

Pentachlorophenol has proved by factual tests to be the most potent chemical for termite control. All TERRATOX solutions contain a minimum of 5% Monsanto Pentachlorophenol.

- Available NOW in freight saving concentrate form.
- Write TODAY for complete details to help you promote profitable customer pleasing jobs.

WOOD TREATING Chemicals Co.
5137 Southwest Ave.
St. Louis 10, Mo.

A. F. C. QUALITY PRODUCTS FOR PEST CONTROL

Chlordane, oil concentrate, liquid emulsifiable concentrate, wettable powder concentrate, and ready-to-use liquids and powders.

Super Fluorex V, powerful insecticide powder

Sodium Fluoride

Poison Seeds

Pyrethrum and **DDT,** powders and liquids

Paradichlorobenzene

FOR EFFECTIVE RAT CONTROL

Phosphorous Paste
Rumetan
Fortified Red Squill Extract and Powder
Antu and **Antu Tracking Powder**
Thallium Sulphate
Barium Carbonate
Arsenic White

FOR TERMITES

Orthodichlorobenzene, Creosote Oil, Sodium Arsenite Powder, Pentachlorophenol Concentrate

Write for particulars and prices

AMERICAN FLUORIDE CORPORATION
151 WEST 19TH STREET NEW YORK 11, N. Y.

RODENTICIDE INSURANCE

Our Public Liability policies give you essential coverage against the risks of "1080." Certificates of Insurance issued to meet your requirements.

Other type policies, in all representative AMERICAN STOCK COMPANIES, for:

Public Liability — **Workmen's Compensation**
Auto Liability — **Products Liability**
Property Damage — **Accident & Health**
All Allied Lines

AS WELL AS

Life Insurance and all Forms of Employee Insurance Plans

MEMBER NATIONAL PEST CONTROL ASSOCIATION

INQUIRIES CORDIALLY INVITED. THERE IS, OF COURSE, NO OBLIGATION.

B. & D. A. WEISBURGER
INSURANCE SINCE 1915
1440 Broadway **New York City 18, N.Y.**

Letters

TO THE EDITOR

White-Stomached Rats

Last month we printed a letter from PCO Vern Walls in Cedar Rapids, Iowa, asking for an explanation of the white stomachs found on the rats he exterminated in and around a small processing plant. At the time we didn't have an answer, but we consulted with Dorr Green, chief, Branch of Predator and Rodent Control, who advises.

The description that they were "very big rats, all of which were very dark on their backs, almost shiny black, with totally white stomachs" is inadequate for taxonomic purposes. In instances of this nature it is suggested that specimens be furnished to a local museum for further study, or freshly killed animals may be packed in dry ice and shipped air express to Mr. Stanley P. Young, U. S. Fish & Wildlife Service, National Museum, Washington 25, D. C. Mr. Walls reference to the fact that these were "very big rats" would indicate they were the Norway species. On the other hand, the statement that "they showed more than average resistance to poison" could indicate black rats, since this group are more finicky eaters and somewhat more resistant to some rodenticides such as red squill and antu.

Diet of the animals has no known effect on coloration. However, color shade of many field rodents varies along with the soil type in which they live. Generally speaking, it is not unusual to find wide variations in Norway rats. These colors may range from an almost pure gray to reddish brown, or nearly black, and partial albinos are not rare. The Fish & Wildlife collection at the National Museum does not contain specimens of Norway rats identical to those which Walls describes. There are some which are black on the back and show only short, narrow streaks of white on the belly. However, a number of specimens with brown backs do posses clear, white bellies.

The three sub-species of black rats also vary in color. A dark gray back and dark gray underside is characteristic of type specimens of *Rattus, rattus, rattus* which occur principally on vessels and around southern seaports and river fronts. The most common black rat of our southern states, *Rattus, rattus, alexandrinus*, is typically brown to black on the back and dark gray on the belly, the tips of the underfur being white and grading to a slight gray at the base. The third member of this group, *Rattus, rattus, frugivorus*, is quite rare in this country and differs from the other two in that type specimens have brown backs and white or yellowish undersides. All three are smaller than Norway rats and are most easily distinguished by their great tail length.

1080 Caution

Dear Sir: For a possible photograph in some some one of your future editions, I should like to refer you to the January 15th issue of *Modern Industry* for an excellent picture of a laboratory technician preparing "Compound 1080" in the Monsanto Chemical Plant.

A. P. Lynch
Somerville, Mass.

Modern Industry magazine couldn't furnish us with the picture referred to, but Monsanto could. You can see, it's a good one.

Hexagonal Bee Cells

Dear Sir: On page 28 of *Pests* for February 1949, in J. R. Gross' column, you state that the hexagonal honeycomb in bee cells caused by pressure and that the bees make no attempt to put angles on the cells. Apparently A. I. and E. R. Root in their publication, "The ABC and XYZ of Bee Culture," have a different theory and I quote a few lines which appear on page 417 of their book:

"Some have argued that bees made their cells cylindrical in the first place, and then, by pressure from within, force the cells into the forms of hexagons; but unfortunately for this theory, plaster casts, of which cross-sections have been made of combs in all stages of construction, show that bees start their work by making true hexagons and not circles or cylinders. This can be seen by looking through a piece of glass on which combs have been built."

H. A. Kruce
Abalene Pest Control, Inc.
Plainfield, N. J.

James I. Hamleton, Division of Bee Culture, USDA, seems to agree with Gross and differs with author Root. When we referred the question to Hamleton he wrote that there are many fantastic ideas regarding the shapes of honey bee comb cells, but most probably the hexagonal shape which finally results is due to pressure. Optical illusion may also play some part in making the cells seem more uniformly hexagonal than they really are for at their outer ends and where they are attached to the frames, the cells become somewhat circular. "After all," he says, "they are really cylindrical tubes." It may be borne in mind that a circle can be exactly surrounded by six other circles with radii equal to its own, as Mr. Gross pointed out. Professor Edward F. Bigelow, in his article, "The Story of Honey-Comb," points out that soap bubbles confined between two sheets of glass become short hexagonal tubes.

Greater Resistance

TO ANY SOLUTION

K.B. BRAND

ALL-PURPOSE

EXTERMINATOR SOLUTION HOSE

Write for your FREE SAMPLE today!

Fully Guaranteed!

K. B. Brand hose will outlast any comparable product, we'll gladly refund your money, should it fail!

Specially compounded tube highly resistant to any solution. Light, flexible, easy to handle. Withstands high pressures and years of heavy duty without swelling or leaking. Write, today, for prices and descriptive folder on hose and couplings.

ALSO ROCK WOOL HOSE AND CYANIDE HOSE

BROADWAY RUBBER CORPORATION

LOUISVILLE 2 — Manufacturers since 1901 — KENTUCKY

PCE

FOR THE PCO

PCE equipment, material, and supplies are selected especially for the PCO . . . which means you'll find them practical, professional, and economical. And PCE stocks a COMPLETE line; write for detailed information on these and other items in which you are interested.

NOZZLES
Spraying Systems Co. specialized nozzles at new low factory established prices.

PCE PESCUPS
The superior disposable cup for poison placing.

PCE PLASTIC PINTS
Unbreakable . . . and Unbeatable.

PCE FIBRE SERVICE CASES
In stock or custom made sizes and shapes.

Pest Control Equipment Co.
47 West 43rd Street — New York 18, N. Y.
VAnderbilt 6-5390

AND NOW for the First Time . . .

DYNAMICE

with

ZINC PHOSPHIDE

The Best Mice Killer Ever Made

★

A complete bait skillfully blended with choice foods of proven acceptability to mice. Tested by leading independent laboratories.

Ready to Use — Nothing to Add — Nothing to Mix

In Pound Containers — ½ lb. tubes and 4 oz. tubes

Velodent Products Mfg. Co., Inc.
429 West Broadway, New York 12, N. Y.

The Makers of
KANT-LIV Rat Paste with Fortified Red Squill
and
VELO Rat Paste with Antu, both in handy tubes.

PCO NEWS...

L.A. PCOs Cooperate With City Health Dept. in Institute

The pest control operators of the Los Angeles area, in cooperation with the Los Angeles City Health department held a six-day pest control institute running through late April and early May. It is reported that approximately 200 attended each meeting. Credit for the success of these meetings go to Charles Senn, C. K. Stewart and George Greenhalgh of the L. A. City Health department, to Karl Hassler, secretary of the PCOs of LA area, J. Daniels, Master Pest Control Co., Fred Switzer, Western Exterminator Co., Basil Gough, Columbia Pest Control and to men of the staff of the U. S. Public Health state Typhus Survey Unit, including Orville Meyer, captain, and Howard Hollander. Discussed were: health department relations, industry public relations, new developments in rodenticides, results of an anti-rat publicity campaign, ordinances and regulations, rodent-borne diseases, ectoparasites of rodents and numerous other related topics. Films on the use of 1080, residential rat-proofing and rat eradication measures were also shown.

Certificates were issued to delegates at the close of the session which met each Wednesday from April 13th through May 18th.

CALENDAR OF MEETINGS

E. Pennsylvania Pest Control Assn. Meeting, Robert Morris Hotel, Philadelphia, Pa., June 9, 6:30 p. m.

Florida Pest Control Assn. Annual Meeting, and election of officers, El Commodoro Hotel, Miami, Fla., June 10, 11.

NAIDM Convention, Drake Hotel, Chicago, Illinois, June 13 and 14.

New Jersey Pest Control Assn. Meeting, Rutgers University, New Brunswick, N. J., August 15.

NPCA Convention, Biltmore Hotel, Los Angeles, California, October 17 - 19.

Stork Visits Siberts

For a while it looked as if Ted Sibert of Paramount Pest Control Co., Oakland, California, was going to give Bing Crosby such a run for his money that Ted could start his own six-man football team. Yep, there are six boys in the Siebert family . . . or *were* until Mrs. S. decided to change the trend and present her hubby with nine-pound baby girl, Deborah Ann, April 28th. Nice while it lasted, fellas, but now let's show a little courtesy to your sister.

Girl for Greshams

Mary Lorraine is the newest member of the Christine and Bill Gresham household in Tampa, Florida. Weighing in at six pounds on May 2nd, she says, in her own abbreviated way, "Glad I've got such nice parents!"

Papa Gresham, formerly an entomologist with the Florida Pest Cotrol Board, now operates his own PCO firm known as the Young-Jones Laboratory, Inc.

Orchids! Orchids! Orchids!

Flowers to the PCO! Anyway there's variety in the pest control business operated by Ernie Forde of the Chemtox Co., Ltd., Honolulu. He's swamped with orchids at least once a year . . . Mother's Day. Because of this holiday, he has ten thousands orchids a day to fumigate for a week or so prior to the event. Quarantine restrictions require fumigation for entry into the mainland.

H. K. Edwards Dies

H. K. Edwards, pioneer PCO and termite operator and founder of the Globe Exterminating Co., Los Angeles, Cal., died on May 6th. It is reported that his business will probably be continued under the direction of his son, John, who presently maintains his own termite fumigation business.

Carl Lien

Lien Elected NSSA Pres. At Chicago Convention

Carl B. Lien, president of the Lien Chemical Co., Franklin Park, Ill., was elected president of the National Sanitary Association at its convention held in Hotel Sherman, Chicago, May 8-11. PCO Elmer Kuntz is associated with the pest control division of Lien Chemical in Chicago.

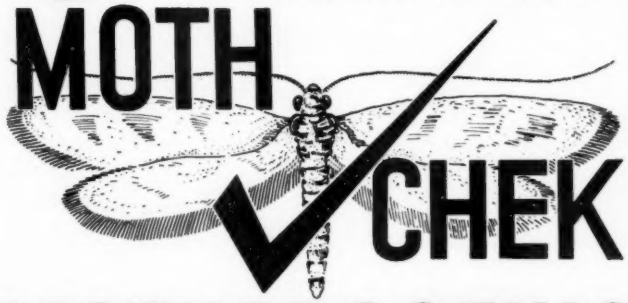
Other officers elected were: Al Candy, Jr., Candy Wax Co., Chicago, vice president; Don Peatee, Mellocraft Co., Toledo, O., treasurer; Lacy E. Crain, Conco Chemical Co., Dallas, Texas, secretary of the board; and directors — Leo J. Peck, retiring NSSA president, St. Louis, Elmer H. Bard, Muskegon, Michigan, William O. Conley, Spokane, Washington, Ed Hale, Albuquerque, N.M., Jack Doyle, Grand Rapids, Michigan.

Over 115 exhibits of sanitary supplies highlighted the four-day meet which included two luncheon-business sessions and a grand-finale banquet Tuesday evening. It was estimated that better than 1000 people attended the show, including the general public which was permitted to view the exhibits all day Sunday and Tuesday morning. Exhibits were not open during business sessions.

NSDA Sprayer Campaign

A spring campaign designed to increase dealer sprayer sales has just been announced by the National Sprayer & Duster Association.

5 YEAR WRITTEN GUARANTEED MOTH CHEK MOTHPROOFING



A Detroit hotel buys a $1248.00 job of MOTH-CHEK moth proofing for carpeting from one P.C.O. . . . Investigate your potential profits from jobs like this.

MOTH-CHEK is ODORLESS, COLORLESS, STAINLESS. SAVE TIME, MONEY and WORRY.

Every job is guaranteed for 5 years.

PROVEN PROFIT MAKERS FOR P. C. O.'s

WRITE FOR SAMPLES AND DETAILS

FLAME CHEK

The amazing liquid that STOPS the spreading of Flames

Profits . . . More Profits . . . Extra Profits . . . Any way you look at it. One P.C.O. "FLAME CHEK"ED an industrial plant for $3000. Another "FLAME CHEK"ED an auditorium for $900. Can you use "extra" business like this? FLAME CHEK flameproofs rugs, drapes, upholstery, paper, etc. Applied by Spraying. Approved by Fire Departments in 25 big cities and 3 states.

Every job is Extra Profit!

CHEK PRODUCTS CO., INC. 31 NASSAU PLACE, EAST ORANGE, N. J.

Drill Brick, Cement, Stone *with the amazing* Kennadrill

- Drills up to 5 times as fast
- It stays sharp up to 100 times as long
- Efficient in all nonmetallic building material

Pest control operators find the Kennadrill a big saver of man-hours and money. It helps them finish jobs faster and it takes most of the muscle work and drudgery out of tough masonry jobs. The Kennadrill features an edge of solid Kennametal . . . a tungsten carbide edge that stays sharp. It has diamond-like hardness, yet an even greater resistance to impact or shock than the best grades of steel. It gives long life, can be reground, and it is easy on the power. Cuttings are kicked out with an ejecting action. There's no binding, no sticking, no kick in the drill.

Bits are from ¼" to 1½" in diameter and they can be used in rotary drills.

Write for bulletin PCK now.

KENNAMETAL *Inc.*, LATROBE, PA.

PENICK INSECTICIDE BASES

PYRETHRUM—Pyrefume Super 20 • Powder • Emulsifiable Pyrefume

PYRETHRUM PLUS SYNERGIST—Pyrexcel 20 • Pyrexcel Roach Powder • Emulsifiable Pyrexcel 80

ROTENONE—Liquid Extract • 5% Emulsifiable • 5% Powdered Cube or Derris

PENICKLOR (Chlordane)—50% Wettable Powder • 46% Emulsifiable • 50% Emulsifiable—Stable • 33% Emulsifiable—Stable and Transparent • 20% Oil Solution

DDT—50% Wettable Powder • 25% and 30% Oil Solutions • 25% and 30% Emulsifiable Concentrates

FOR RODENT CONTROL—Dethdiet Red Squill Powder • Rodine (liquid extract of red squill) • Antu Technical • Antu 20% Tracking Powder

The World's Largest Botanical Drug House

S. B. PENICK & COMPANY

50 CHURCH STREET, NEW YORK 7, N. Y. Telephone, COrtlandt 7-1970

735 WEST DIVISION STREET, CHICAGO 10, ILL. Telephone, MOHawk 3651

Benton Wilcoxon

Wilcoxon, Powell Ala. Manager

Benton Wilcoxon has been appointed general manager of the John Powell Chemical Company, Inc., Huntsville, Ala., a recently formed subsidiary of John Powell & Co., Inc., 1 Park Avenue, N. Y.

An M.I.T. graduate and one-time chemical engineer for Standard Oil of California, Wilcoxon also served on the War Production Board Chemical Section during the war, and later was consulting engineer to the U. S. Army in Germany.

Prior to his appointment by Powell, Wilcoxon was production manager of the Calabama Chemical Company. He will head operations of Powell's new 60,000 square foot insecticide plant in Huntsville.

New Mice Bait

Dynamice is the name of the new, ready-to-use mice food bait, reportedly developed after nine months' research work by its manufacturer, Velodent Products Manufacturing Co., 427 W. Broadway, New York city. Using zinc phosphide in combination with acceptable foods to mice, Dynamice can be placed, as is, around where there is a mouse infestation. It is said independent tests have proved the acceptability of this product, which is available in one pound containers and 8 ounce tubes for PCO use and in 4 ounce tubes for re-sale. Full information can be obtained by writing Velodent at the address given above.

New Dress For New Products

Nott Manufacturing Co., Mt. Vernon, N. Y. has placed on the market two new products in attractive packages. Sel-tox, described as a selective crab grass killer for lawns, golf courses, etc., comes with a black, red and green label on pint, quart, half gallon or gallon bottles. Ant-X Ant Powder, a new ant, roach, silverfish, flea and bedbug powder with 2% chlordane, likewise is dressed up with a three-color label on an adjustable, shaker-top, 3 oz. container.

Designed for over-the-counter sales, these two products have a 40% dealer discount and are reportedly backed up by national advertising in leading Sunday newspapers. Full information can be obtained from tht company.

Nott manufactures also the well-known Ant-X traps and Ant-X jelly.

Addresses U. of Mass.

Charles Pomerantz addressed various groups on the University of Massachusetts campus, April 25 and 27, on the subject of Rickettsialpox.

On the morning of the 25th Pomerantz spoke before the Department of Bacteriology and Public Health in the field of Communicable Diseases, and during the afternoon to the Bacteriology Club.

Pomerantz addressed the Fernald Entomological Club of the University, on this disease he discovered in 1946, on the 27th. In company with Dr. Walter W. Lee, who is in charge of Public Health Work at the University, he also talked before a group of nurses in the Visiting Nurses' Association of West Springfield, Mass.

Insecticide Wax

Kare-33, a liquid water-emulsion wax treatment, waxes the floor and aids in insect control, according to the Windsor Wax Company, Inc., Hoboken, New Jersey, the manufacturer. It is a blend of high-melting point waxes fortified with chlordane.

The company claims that in repeated tests, 100 per cent kill of roaches was obtained within 24 hours by covering the floor with a single coat of Kare-33, and that it is also supposed to kill waterbugs, ants and silverfish.

Killing power of Kare-33 as applied on the floor, supposedly lasts up to three weeks or more, until the wax is worn off the floor. This wax is a no-rub type with a simple method of application.

Farnam Port-a-Spray

First showing of the Farnam Port-a-Spray, a reasonably priced portable power sprayer was held in April by the Farnam Equipment Co., Omaha.

Powered by a 1-1½ H.P. Lauson gas engine, it is said to shoot a driving stream up to 25 feet, or adjusts to a fine cloud of spray mist, and delivers a gallon a minute at pressures adjustable up to 150 lbs. The sprayer weighs 75 lbs. and is 18 inches wide.

Farnam claims that in addition to spraying livestock, buildings, gardens, trees and shrubs with insecticides, weed-killers and other chemicals, the Port-a-Spray may also be used as a portable fire fighter, portable water moving pump, or portable power plant.

Ludvik Goes to TVA

Dr. George F. Ludvik, with the Illinois Natural History Survey for eight years, has taken a position with the biology section of the malaria control branch of the Tennessee Valley Authority, Wilson Dam, Alabama.

He is credited with the development of TEPP, tetraethyl pyrophosphate, as an insecticide which proved to be effective against aphids and mites.

Disclosure of Dr. Ludvik's work was made in 1947 during the experiments, in the Natural History Survey laboratory, on a Monsanto Chemical Company fellowship, under the direction of Dr. George C. Decker.

Before his work on the Monsanto project, Ludvik served for 40 months in the Army Medical Corps, with 17 months in England, France and Germany.

Mildew Control Guide

Monsanto Chemical Co., St. Louis, Mo., has just issued "A Guide to Formulating and Applying Milmer 1" which is available free to interested parties.

Milmer 1, chemically cooper-8-quinolinolate, is claimed to be one of the most powerful rot and mildew preservatives known. It is said to be virtually non-toxic to man, does not irritate or sensitize skin and is not decomposed by ultra-violet light. The fifteen-page bulletin, based on extensive field and laboratory experience, gives detailed descriptions of the material, and minimum formulations and methods of application.

Mich. Chem. Elects Wismer

Roy N. Wismer was elected president of Michigan Chemical Corporation, Saint Louis, Mich., at a recent meeting of the board. of directors. Col. T. C. Davis, former president, was named chairman of the board.

Wismer has had previous experience in industrial management, with Fisher Body Corporation and other divisions of General Motors.

Other new officers of the company are: R. A. Bondurant, executive vice-president and continuing as general manager; L. D. Simmons, formerly production manager and now vice-president in charge of operations; A. M. Byers, vice-president; Paul W. Blume, secretary, and C. G. Woods, comptroller and treasurer.

Bondurant has been with Michigan Chemical since 1943, formerly as technical director, and was with the Westvaco Chlorine Products Corporation. Simmons was formerly with the Dupont Company in a supervisory capacity.

Directors of Michigan Chemical are Wismer, Davis, Bondurant, R. E. Brownell, J. H. McMullen, Newel Wallace, C. S. Mott, C. E. Wetherald, R. P. Place, Harding Mott and S. E. Knauss.

Albia Products New Trap

Albia Products Co., 1 East 42nd St. New York city, has been appointed the sole distributor for a new metal mouse trap called "The Metal Cat," according to Frank Weismann, owner of the company.

The trap is circular in shape, five inches in diameter, 2½ inches high and has a burnished copper color, with an opening on the side. A mouse enters in an attempt to get bait from a receptacle and automatically closes the port hole through which it entered. Then the mouse is removed by submerging in water, turning the top and the catch is emptied without touching or seeing the rodent.

Weismann states that the trap has genuine eye-appeal and believes that it will prove a good seller for PCOs as a package item.

Apple Joins Univ. of Wisc.

James W. Apple, associate entomologist, with the Illinois Natural History Survey for seven years, has taken a position as associate professor of economic entomology at the University of Wisconsin, in Madison, where he will do research on canning-crop insects.

Prior to working at the Survey, Apple was associated with the U. S. Bureau of Entomology and Plant Quarantine, an instructor at Iowa State College and at Oklahoma A & M College.

Barton to Innis Speiden

Richard H. Barton recently joined the insecticide Sales Division of Innis, Speiden & Co., 117 Liberty St., New York city.

Representing the insecticide sales division of the company's Philadelphia, Pa., branch office, Barton's territory will include Southeastern Pennsylvania, Southern New Jersey, Delaware, Maryland and Virginia.

He has attended New York University and the University of Hawaii.

Keeley Elected USI V.P.

Election of William C. Keeley as executive vice president of U.S. Industrial Chemicals, Inc., was recently announced by William P. Marsh, Jr., President.

Keeley, who assumed his new duties on May 2, was a vice president of Air Reduction Company, Inc., from 1936 to 1948 and served as chairman of its finance committee during the past year.

PCO NOTEBOOK

by

J. R. Gross

Trespassers Beware

When he eats, he tosses the tormented bodies of his victim underneath his dining-room table — mute gruesome evidence of vermin trespassers.

But what's meat to the spider is means to the pest control inspector. Every web is a little recording machine that yields concrete evidence for those who care to read the signs.

The phone rings. An angry voice of one of your customers coldly lets you know, roaches are over-running his place again. You rush out, driving at top speed.

"Where are the roaches?"

"There were dozens running all over the place yesterday," he says.

You flash your light into every likely spot — no roaches. Then you glance under some webs. Sure enough! There in little piles are "dozens" of little insects, but not roaches, just some outdoor invaders that vaguely resemble a roach. You carry some to the customer.

"Is this what you saw boss?"

"That's him all right," the customer replies.

And relief breaks out in a cold sweat all over you. The contract is saved, because it isn't hard to convince him that the bugs weren't roaches and he appreciates your speedy response to his call.

But even more important is the help spider webs can give when you are expected to know within a few moments just what vermin are active in a strange building. Those spider webs can tell you volumes.

For example ants may be infesting a building. When you get there, often not a single live specimen is to be found. But under the webs you will usually find some of them carefully wrapped in spider silk. Some times the numbers found will even help you locate the source. Nor are they always ants. That complaint of ants might prove to be termites.

Then there is indirect evidence that webs can offer. For example if you find them stretched across a rat hole it isn't dificult to deduct that no rats have been using that spot.

So when you are down in the the dark places, where those itching invisible strands cling to your face, don't curse the spider — just call him your dirty little pal.

DDT-Mouse Powder Cautions

Heretofore, 50% DDT powder has been recommended for use as a "tracing" material being dusted, distributed or placed around the perimeter of a room in house mice control. Now this use is cautioned against. It is recommended that, if the powder is used, it should be placed in holes, recesses, underneath the bottom shelf of built-in equipment and in the blind sections under food counters.

Since 50% DDT has been found to be an effective control for mice in food processing plants, it is obvious that the powder cannot be used in any manner which might cause contamination. Therefore, care must be exercised so that the powder is in no open places where bags of food products may fall from their storage positions upon, or be dragged through the dust.

Cal. Termite Section Meets

Karl Hassler, secretary of the Los Angeles District of the Pest Control Operators of California, Inc., called a meeting late in April to formulate a definite program for the Termite Section to participate in the forthcoming NPCA convention to be held in Los Angeles in October. Hugh Smith, president of the state association, was chairman. Those attending were Wilfred Gunn, D. C. Tracy, Bob Mesecher, NPCA regional vice president, and Kenneth Scott of Pasadena.

Questions and Answers

Q. We have many restaurants which are bothered with flies and have used a chemical spray, but the resulting odor was so bad that we had to wash down the walls. Could you suggest what we might use that will be effective without an objectionable odor? Also would you tell us what is best for bedbugs?

A. There are very few, if any, chemicals which can be used for fly control that do not have some odor in themselves. It is necessary to apply these materials at a time when the areas can be completely ventilate after the application, to reduce any possible chance of continuing smell. A 3% DDT and 2% chlordane solution in an oil base is being recommended for fly control, and we are told that a lasting odor does not persist. Both emulsions and solutions have odors, but, in general, emulsions are less odoriferous.

Part of the problem seems to lie in educating the customer to expect a litle odor in order to give him the protection he desires. It is a matter of having some odor or flies.

Sometimes a water-wettable DDT and chlordane solution is used, but if it is not applied correctly, spots will remain on the wall. Most of the odor, we are told, comes from the solvent. Perhaps the best method of solving the problem is to test the materials from the company you think best, before using it on any big job.

DDT in solution or in an emulsion is best for bedbug control. Powders usually are not as effective.

Q. We understand that shade tree sprayers back East are able to spray in excess of 100 feet high. Can you shed any light on the type of equipment used?

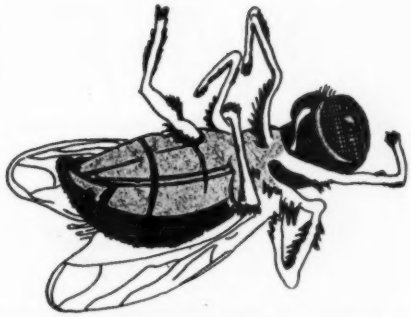
A. Charles F. Irish, one of the country's leading arborists, says there is no equipment available that will give satisfactory coverage in excess of 100 feet up. On a very calm day, it is possible sometimes for the spray to go as high as 150 feet with a mist sprayer, Mr. Irish says, but this is dfficult.

FOUR YEARS of Extensive Commercial Application Has Proven That

Chemiste Fly - Proofing

Eliminates Flies for the Entire Summer with Application on Walls and Ceilings

- **INCREDIBLE RESULTS**
- **UNPRECEDENTED PROFITS**



IF YOU ARE LOOKING FOR A CORRECTLY FORMULATED FLYPROOFING SOLUTION THAT REALLY WORKS USE THE Chemiste TRADE MARK SAY "SHEM-EAST" FLYPROOFING CONCENTRATE.

CHEMISTE ELIMINATES COSTLY GUESS WORK AND FLIES

FOR THE LATEST TECHNICAL AND SALES PROMOTION IDEAS WRITE

The Chemiste SAY "SHEM-EAST"

Continental Chemiste Corporation
2068 W. Ogden Ave. Chicago 12, Illinois

SCIENTIFIC PROCESS

TRADE MARK Reg. U. S. Pat. Off.

New! **Pencil-size POCKET MICROSCOPE**

MAGNIFIES AREA 400 TIMES (20X)
PRECISION-BUILT
SHARP IMAGE
NOTHING TO ADJUST

ONLY $2.98

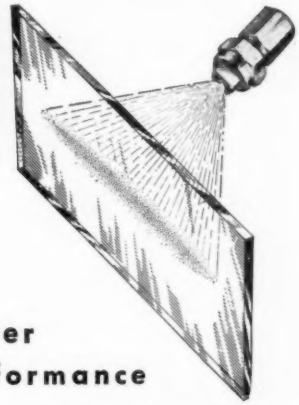
Now! A powerful pocket microscope to reveal hidden things. Amazing power. Sand looks like expensive gems, a handkerchief like a net. Has a multitude of uses. Replaces many costly microscopes. An excellent inspection instrument in many industries. Instant focus. No adjustments. Perfect wide field. Aluminum body beautifully finished. Amazingly low price. Marvelous for everyone. Multiplies the pleasures of hobbies. Opens a WONDERLAND FOR CHILDREN. Order today. Send 3 dollar bills. Will ship return first class mail. Full refund and 5 day trial. No c.o.d.

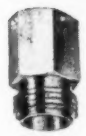
4 LENS OPTICAL SYSTEM

Used by:
- HOBBYISTS
- STUDENTS
- TEACHERS
- PRINTERS
- BANKERS
- ENGRAVERS
- ENGINEERS

DU MAURIER CO., Dept. 136 Elmira, New York

SPRAYING SYSTEMS
TeeJet
SPRAY NOZZLES





BODY

CAP

STRAINER with monel metal screen

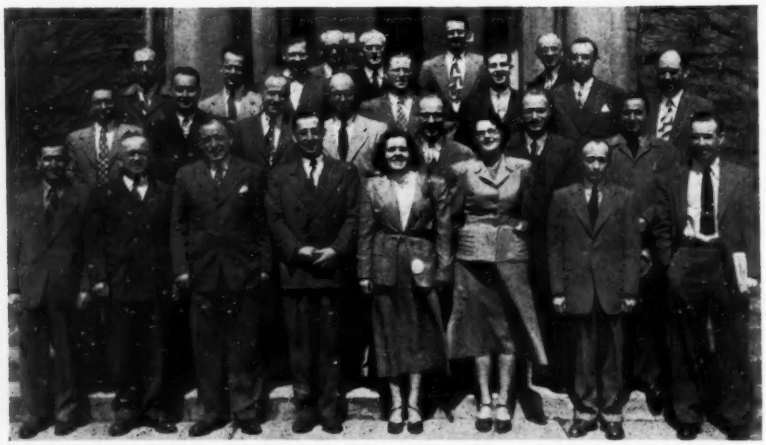
interchangeable ORIFICE TIP

better performance

For the residual spraying of insecticides, you will find TEEJET spray nozzles give the uniform distribution and proper atomization necessary for an effective spraying job. TEEJET spray nozzles are precision built with a wide range of interchangeable orifice tip sizes. Write for complete information.

SPRAYING SYSTEMS CO.
Engineers and Manufacturers
3221 RANDOLPH STREET • BELLWOOD, ILLINOIS (Suburb of Chicago)

ORGANIZATION NEWS...



Group picture taken at New York PCA Short Course

Ga. PCA Convenes and Elects

Officers and directors for 1949 were elected at the most recent convention-meeting of the Georgia Pest Control Association, April 22, 23, Savannah Hotel, Savannah, Ga., which was attended by better than fifty delegates.

Newly elected are: Carl Conradi, president; F. H. Yates, vice-president, and R. Tindle, secretary-treasurer. New directors are: Marcus Kaplan, Fred Wright and Glenn Burnett.

Mich. PH Men & PCOs Meet

A meeting of Public Health officials and pest control operators, in and around Grand Rapids, was held May 2nd, Morton Hotel, Grand Rapids, for the purpose of getting better acquainted and discussing the many problems common to both groups. The meeting offered a sounding board for possible future cooperation in the promotion of better conditions in public establishments provided a means of a more clear understanding of responsibilities and expressed the desire to give the individual owner or manager of these places all assistance possible through an educational program to result in an ultimate improved sanitation control system.

Special guest of the evening was Ira Hatfield, pest control specialist from St. Louis, Mo., who gave counsel on the subjects discussed.

Present at the meeting were: Dr. E. F. Meyer, John Veenstra, Paul Wertsch, K. R. Kerr, and Dr. Donald Coohon, all of the Grand Rapids Health Dept., and John B. Reynolds of Allegan County Health Dept., Grand Rapids PCOs present were: Frederick Kuhn, C. W. Bazuin, William Weber and Jack Hodge of Breath-O-Death Laboratories; Charles R. Wells, Wells Exterminating Service; and Harold Smitter, Calude Pilmore, Eric Smitter, Lyle Fuller, and L. J. Staples of Smitter Pest Control Service. Kalamazoo's Industrial Pest Control Engineers was represented by Albert and Eugene Bushouse.

Conn. PCA Hears Buettner

William O. Buettner, executive-secretary of the National Pest Control Association, was guest speaker at the annual banquet meeting of the Connecticut Pest Control Association, April 26th, at the Hotel Oneco, New Haven, Conn. His talk was on today's happenings in the industry and timely topics that concern the PCO.

Other guests at the banquet were: Neely Turner, of the Conn. Agricultural Experiment Station; Dave Mason and Kenneth Cook, president of the New England Pest Control Association. "Pete" Bohman was toastmaster for the evening's program.

The following attended the meeting: J. C. Reynolds, Lester Bureau, Frank Lavery, Joe Roog, Pete Borman, Walker Heap, Charles Egan, George Blum, Jack Kalison, Gene Theroux, Tom Ledwith, Charles Barbour, George Dyar, Grace Dyar, Bill Banta, Bill Ghent, Frank Jackman, Fred Haas, Harold Levine, W. J. Mongeau, Dave Weisberger, Jack Benmoche, F. Kirkpatrick, Mark Weintraub, and Hart Harris.

21 Attend Second N.Y. State PCA Short Course

The 2nd annual meeting, N. Y. State Pest Control Association was held at New York State College of Agriculture, Cornell University, Ithaca, N. Y., April 13 and 14, 1949, under the supervision of Dr. Charles E. Palm, head entomologist at the university. Twenty-one PCOs from upper New York State registered.

In the morning of April 13 the group was divided into two laboratory sections; one on Wood Boring Insects supervised by Prof. Henry Dietrich, of the university; the other heard a discussion on Ants, Termites and Dermestids by Prof W. S. L. Pate. Both sessions had laboratory specimens to study and examples of damage caused by these insects.

Officers for '49 were elected at the business meeting in the afternoon. Those elected were: George W. Dummitt, president; Leon A. Moore, vice president and Donald H. Lewis, secretary-treasurer. Paul McMahon and Harry Linindoll, were elected directors.

Dr. D. L. Collins, of the State Entomologist's office, then presented a movie about ticks and their control and discussed this subject along with black fly control as it is related to the PCO. He pointed out that the eastern dog tick is a vector of Rocky Mountain Spotted Fever and is becoming established in lower New York State.

A banquet was held in the evening at the Clinton Hotel, in Ithaca. Prof. R. W. Leiby presented the last lecture on the control of wood boring insects, ants and dermestids. Paul McMahon was toastmaster.

The morning session of the second day consisted of a talk on insecticides by Prof. J. E. Dewey and one on formulations by Prof. L. B. Norton.

Prof. W. R. Eadie led a discussion of rodent control in the first afternoon session, followed

Lick 'Em With Lucide

PCE

Lucide A-20 helps you win the never-ending battle with insects and pests because its longer lasting residual effect stays on the job in locations where Lucide is subject to wetting after application.

That means around sinks, in basements, and outdoors, you'll be making less call-backs when you use Lucide A-20 . . . and getting more customer satisfaction.

Lucide A-20 is a true colloidal emulsion of refined grade Chlordane. It doesn't separate, doesn't need shaking or agitation, and is completely fireproof.

1 Gal. Lucide A-20 plus 9 gal. water makes 10 gal. 2% refined grade Chlordane — residual formulation.

1 Gal. Lucide A-20 plus 19 gal. water makes 20 gal. 1% refined grade Chlordane — for maintaining residual effect on call-backs.

1 Gal. Lucide A-20 plus 39 gal. water makes 40 gal. ½ of 1% refined grade Chlordane — animal parasite formulation.

1 Gal. Lucide A-20 plus 79 gal. water makes 80 gal. ¼ of 1% refined grade Chlordane — for general outdoor use; gardens, crops, etc.

NEW LOW PRICES

55 gal. drums $4.25 per gal.

5 gal. container $4.75 per gal.

1 gal. container $6.25 per gal.

All Prices F.O.B., N.Y.C.

PEST CONTROL EQUIPMENT CO.

47 WEST 43rd STREET VAnderbilt 6-5390 NEW YORK 18, N. Y.

Use PRENTOX

CHLORDANE (Concentrates & Dust)

PYRETHRUM (Powder & Extract)

RED SQUILL (Powder & Liquid)

DDT PRODUCTS

For PEST CONTROL

MICRO-MESH 50% DDT POWDER

Made in Clay base

available for immediate

delivery.

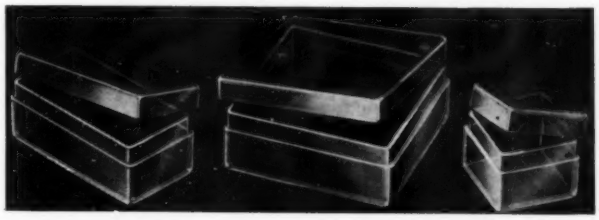
Packed in 50 lb. drums.

P

R. J. Prentiss & Co., Inc.

110 WILLIAM STREET NEW YORK 7, N. Y.

TRANSPARENT PLASTIC SPECIMEN BOXES



For keeping insects and other specimens in orderly arrangement, for quick reference.

These transparent boxes protect specimens, both before and after identification. They enable you to build up a valuable permanent collection of specimens for future reference.

THREE SIZES (Outside Dimensions)	PRICES
A: 15/16" x 15/16" x 3/4"	A: 20 for $1.00; 100 for $4.60
B: 1 7/8" x 15/16" x 3/4"	B: 15 for $1.00; 100 for $5.60
C: 1 7/8" x 1 7/8" x 3/4"	C: 12 for $1.00; 100 for $6.60

ASSORTMENTS

No. 1: 8A, 4B, 4C $1.00

No. 2: 60A, 20B, 16C $5.00

(We pay postage if remittance accompanies order)

You will be delighted with these unique, transparent, useful boxes.

R. P. Cargille

118 Liberty Street
New York 6, N. Y.

by Prof. H. H. Schwardt who spoke on "Insecticide Resistant Flies." Then Prof. Robert Matheson, George Bradley and Richard Pendleton gave a series of talks on "Mosquitoes and Their Control."

Guests at the sessions were William O. Buettner, executive-secretary of the NPCA, and Dr. Hugh Glasgow, from the Office of State Entomologist.

Ohio PCA Co-op Exhibit

The Ohio Pest Control Association formally introduced its cooperative display at the All-Ohio Safety Congress meeting held at Columbus, Ohio's Neil House Hotel, recently.

This exhibit, built with specially appropriated money contributed by member companies, is designed to be shown at various conventions held throughout the state where a potential market for pest control services exists. Booklets, with the names and addresses of members, are sent along with the display and passed out at the conventions. The booth is manned

voluntarily be personnel from companies belonging to the association.

Harry Studier, past president of the Ohio PCA, reports that 1000 booklets were given out at this first showing, and that 85 live inquiries resulted.

Built of mahogany, the display has three illuminated pictures of rodents and insects lining each side and an exhibition of stuffed rats placed in the middle. Sides of the inset center piece are white, with sides and top painted blue. Booklets are arranged attractively along the front of the exhibit. A fund of $1000 was set aside to provide for the building and maintenance of the booth.

North Cal. PCA Meets

The Northern district of the California Pest Control Association met April 9 at El Rancho Motel, in Sacramento. While the men had a business meeting the ladies were entertained with a style show. After the meeting there was dancing.

Among those attending were: Mrs. Mildred Montgomery, wife of the NPCA President and their daughter Carol; Mrs. Elaine Wilson of Walnut Creek, Calif. and Mrs. Katherine Aitkenhead, wife of the former president of the Calif. PCA.

New Eng. PCA Hears Michael

George Michael, state Food & Drug Administration official, was guest speaker at the April 20th meeting of the New England Pest Control Association held April 20th at Boston's Hotel Lenox. Michael gave a detailed discus-

ASARCO BRAND
THALLIUM SULPHATE
FOR
PEST and RODENT CONTROL
AMERICAN SMELTING & REFINING CO.
120 Broadway New York 5, N. Y.

STIMTOX "A"	RED SQUILL
(Powell)	Deth Diet (Penick)
(.45-.5 Pyrethrins)	500/600 MG/KG
1250—50 lb. drums	15—25 lb. cans
14c lb.	$1.00 lb.
PARIS GREEN	**SODIUM FLUORIDE**
(General-Dow)	6000—1 lb. bottles
500—100 lb. drums	7c lb.
17c lb.	

Chemical Service Corp.
88-02 Beaver St., New York 5, N.Y., HAnover 2-6970

"RAT-GLU"
Catches RATS and MICE
Like Flies on Fly Paper

NEEDS NO *Poison* OR *Bait*
WHOLESALE AND RETAIL
for prices and particulars write to
JOSEPH GABOS
SOUTH DELSEA DRIVE
REG. 1 VINELAND, N. J.

sion of FDA's functions, stressing its inspection service and tie-in with the pest control service offered by professional PCOs.

F. S. Kirkpatrick, Residex Corporation, was also on the program and discussed briefly some of his company's products.

After the acceptance of J. P. Chemical Co., Milford, N. H., into association membership, the group voted to donate $25 to each the national cancer fund and the Children's Hospital.

A committee composed of Ed Maguire, as chairman, Ken Cook, Martin Nugent and Frank Hines was chosen to draw up a code for the use of 1080, a code which is to be submitted at the next meeting for approval and signature of the individual members. Ladies' night was to have been held May 25th.

Present at the April 20th meeting were: Lester M. West and George S. Chapin, Rose Exterminator Co., Boston; Ross M. Houghton, Safety Fumigant Co., Boston; George W. Small, and George Elliott, Ransford Pest Control Co., Worcester; Mark and L. Weintraub, Astor Exterminating Co., Boston; M. E. and Betty Robbins, Ace Sanitation System, Springfield; A. Kaplan and A. Bain, N. E. Exterminating, Lowell; J. L. Maderois and L. Givoue, Fall River Ext., Fall River; L. Y. Goldman, N. E. Pest Control, Providence; Cyril A. Chafe, C. A. Chafe Co., Quincy; Richard L. Keenan, Martin A. Nugent, Jr., C. H. Corey and Bart Eldredge, Waltham Chemical Co., Waltham; Jos. E. LaGasse, Jos. E. LaGasse Co., Boston; T. A. Sheehan, Thos. A. Sheehan Co., Boston; A. A. Mongeau, J. L. Shea, and Bill Mongeau, Pied Piper, Farnumsville; Jos. Messina, Cambridge Exterminating Co.; Edward Maguire, W. A. Maguire Co., Haverhill; Ken Cook, Ransford Pest Control, Worcester; R. M. Cotter, M. P. Lynch Co., Somerville; Morris Schwartz, State Exterminating, Boston; S. M. Taylor, Philip Taylor & Sons, Chelsea; and J. Newman, Newman Chemical Co., Holyoke.

17 Attend Washington PCA Meet

Seventeen PCOs attended the April 27th meeting of the Washington Pest Control Association to hear William O. Buettner, NPCA executive-secretary, report on the national association's activities and give suggestions on special problems confronting this regional group.

Present at the meeting were: B. J. Hayes and N. M. Hall, Action Pest Control Service; J. Harry Britt, R. W. Mende and Wm. E. Roll, American Disinfectant Co.; J. R. Byrne, Apex Exterminating Co.; Paris Brickey, Brickey's District Termite Control Co.; Nathaniel Madden, Arlington Exterminating Co.; Jack Quinn, Capitol Chemical Co.,; H. Barenschee, H. & H. Service Co.,; Jos. Wineburgh, Theo. Meyer Est.; Seymour B. Fain, Owl Disinfectant Co.; Simon Ratner, Ratner Exterminating Co.; R. Hughes, G. Lang and R. Martin, Reliable Exterminating Co.; and Walter I. Bushell, Jr., Western Exterminating Co.

Toxicity to German Roach

A comparison was made of the toxicity of two samples of hexachlorocyclohexane, DDT, chlordane and sodium fluoride to adult female roaches using a dust tower apparatus. The insecticides were tested on the roaches in the following ways: (1) container dusting; a container was dusted and the roaches placed in the container; (2) roach dusting; roaches dusted and then transferred to a clean container.

Using dosage as a basis for comparison the hexachlorocyclohexane sample proved to be more toxic to the German roach in all tests. In spite of its high toxicity, recommendations for its use will be restricted because of the objectionable and persistent odor. The next most toxic material was chlordane, followed by DDT and sodium fluoride, neither of which have the odor.

It was not determined to what extent fumigant action played in the mortality resulting from using hexachlorocyclohexane. Because of the low deposit of active ingredient it seems safe to assume that its action as either a stomach or contact poison was more of a factor in the resulting mortality than fumigation effect.

These data also show that applications for control need only be made to places where the roaches hide or run, and that a lower dosage is required for high kill under these conditions.

— Summary from "A Comparison of the Toxicity of Some New Insecticides to the German Roach" by R. E. Niswander and R. H. Davidson, Ohio State University, as reported in the Journal of Economic Entomology, August 1948, pp. 652-3.

Alhambra Termite Accident

A serious accident which may have resulted from the use of arsenical sprays occurred recently in Alhambra, California. A two-year-old infant died in convulsions about twelve hours after the application of arsenical ground spray of the under area of the house. Final determination has not been made but the reports, when filed, will probably attribute the accident to the spraying activities of the termites operator involved.

PESTALES

Yes, He's a Man

"So you have to run home as usual?" scoffed one of a group at the bar as a timid looking little man rose to leave. "What are you man or mouse?"

"A man, of course," replied the little fellow with dignity.

"What makes you so sure?" demanded the other.

"Because," he explained, "my wife is afraid of a mouse."

Pigeons Win Shoot

The big pigeon shoot scheduled in Aurora, Ill., recently, ended in a complete victory for the pigeons.

Thousands of the birds had moved onto the comfortable ledges of the Barnwell school and made a nuisance of themseles. Irate neighbors finally rebelled and scheduled a mass execution.

But as word of the big shoot spread, some women's clubs in the neighborhood protested that they didn't want a shower of shotgun pellets on their homes.

Somewhat daunted, the executioners appealed to the police department and obtained their promise to do the shooting scientifically. This seemed to satisfy the opposition, and crowds came from blocks around to watch the shoot. Quite a number of pupils also were present, on the chance misplaced shots might break the school windows.

Even the pigeons came, perching on the ledges and looking curiously at the assembled crowd. They waited and waited, but the police never turned up.

It turned out that word of the shoot had reached the ears of two animal welfare leagues, and a steady stream of protests from pigeon-lovers forced the Mayor to call off the whole thing.

Double or Nothing

An Illinois man recently set a rat trap in his hardware store and two weeks went by without any takers. Then our self-elected PCO heard a snap and found two rats in the one trap. Two hours later he heard another snap. It had happened again.

CLASSIFIED ADVERTISEMENTS

When answering ads where box number only is given, please address as follows: Box number, c/o Pests and Their Control, 1900 Euclid Building, Cleveland 15, Ohio.

Rates: "Position Wanted" 5c per word, minimum, $1.00. All other classifications, 10c per word, minimum $2.00. All classified ads must be received by Publisher at least two weeks preceding publication date and be accompanied by cash or money order covering full payment.

PARTNERSHIP WANTED

Chemist, Ph.D. with many years of experience in the field of Insecticides, Disinfectants, Weedkillers, Soaps, Waxes and other sanitary chemicals seeks partner to start new venture or to expand existing small business. South or Southwest preferred. Correspondence and exchange of references are invited to

Box 215 Pests and Their Control

FOR SALE

Complete fogging outfit. Latest model Tifa machine run about 20 hours mounted on 1948 Jeep. Unit and insecticides can be purchased separately. Write for particulars. Fog Service, R. D. 2, Oil City, Pa.

MAILING LIST

2,704 pest control operators, U.S.A. Guaranteed 98% accurate. $10 per thousand. Your envelopes machine addressed, $4 per thousand. Write: Televads, Box 1199, Wichita, Kansas.

Mothproofing Literature

Residex Corporation, Foot of Centre Street, Newark, N. J. has just issued some informative literature for PCOs who are interested in treating for clothes moths or carpet beetles in the form of a booklet, "Why Mothproof?" Also included is a discussion of "Resiproofer," Residex's new improved mothproofing formula. Both of these pieces are available free of charge from the manufacturer to those who may desire them.

ADVERTISERS' INDEX

Acme Protection Equipment Co. May
Albia Products Co. 25
American Cyanamid Co. 13
American Fluoride Corp. 33
American Smelting and Refining Co. 44
John Bean Division Food Machinery Corporation ..27
Broadway Rubber Corporation ...35
Burgess Battery Co. 31
California Spray-Chemical Corp. ..3
R. P. Cargille 43
R. E. Chapin Mfg. Works, Inc. ..May
Chapman Chemical Co. ... 3rd Cover
Chemical Service Corp. 44
Chek Products Co. 37
Chipman Chemical Co. ..... May
Continental Chemiste Corp. 41
Cook Chemical Co. ..... 4th Cover
Craft Chemical Co. ..... Apr.
Cre-O-Tox Chemical Co. 31
The Dow Chemical Co. ..... May
DuMaurier Co. 41
E. I. duPont de Nemours & Co. May
Ewing Manufacturing Co. 15
Essick Manufacturing Co. ..... May
Exterminators Equipment & Safety Suply Co. ..... May
Farnam Equipment Co. 25
Joseph Gabos 44
General Chemical Division Allied Chemical & Dye Corp. 4
Hydro Mist Corp. ..... May
Thos. W. Houchin 46
H. D. Hudson Mfg. Co. 19
Julius Hyman & Co. 17
Innis, Speiden & Co. 23
Kennametal, Inc. 37
Michigan Chemical Corp. ..... May
Mine Safety Appliances 27
Monsanto Chemical Co. ..... May
F. E. Myers & Bro. Co. ..... May
S. B. Penick & Co. 37
Pennsylvania Refining Co. .... May
Peoria Equipment Co. ..... May
Pest Control Chemicals 29
Pest Control Equipment Co. 21, 31, 35, 43
John Powell & Co. ..... 2nd Cover
R. J. Prentiss & Co. 43
Residex Corporation 29
Rose Exterminator Co. ..... May
Solvay Sales Division Allied Chemical & Dye Corp. ..29
Sprayer Corp. of America 23
Spraying Systems Co. 41
Superior Equipment Co. 8
The Termitol Co. ..... May
Todd Shipyards Corp. Combustion Equipment Division 6
U. S. Industrial Chemicals ..... Apr.
Velodent Products Mfg. Co., Inc. 35
B. & D. A. Weisburger 33
Wisconsin Alumni Research Foundation 25
Wood Treating Chemicals Co. 33

San Diego Party

Mary Hogan, part owner of the U. S. Termite Control Co., Pasadena, California, was entertained at a dinner in San Diego given by Mrs. R. L. Tucker, Mrs. J. A. Olgle, Mrs. Edith Pellerin, Mrs. L. W. Christensen, Mr. J. R. McCampbell, Mrs. Scottie Rawleigh and Mrs. C. M. Swope, all wives of California PCOs.

Sprayer Booklet

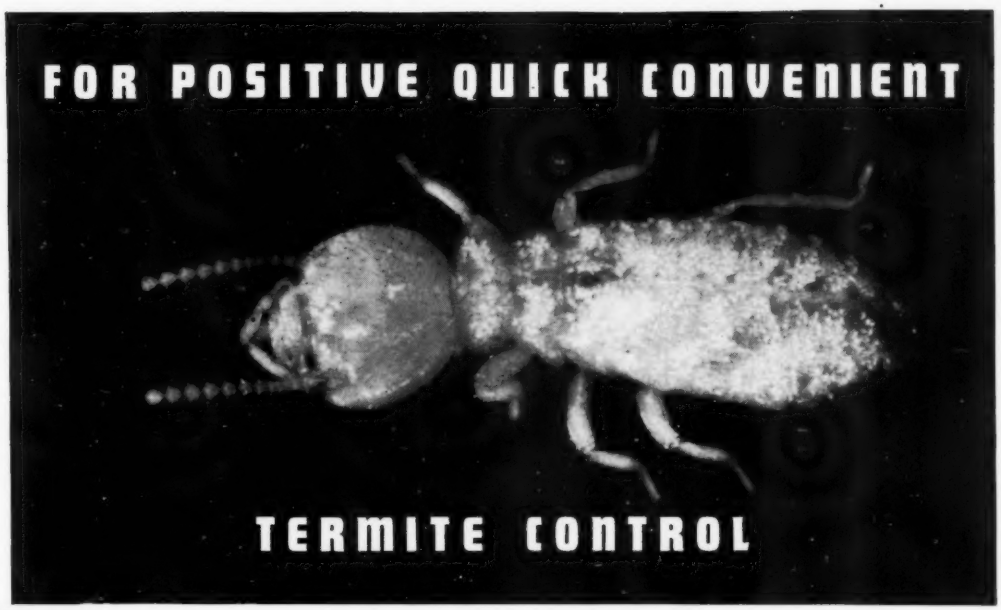
Essick Manufacturing Co., 1950 Santa Fe Ave., Los Angeles 21, Cal., has issued a new brochure illustrating and describing its full line of weed, agricultural and pest control air-power sprayers, including accessories. Copies are available free of charge upon request.

Houchin's "Dandy" Blower

Best Quality Red Rubber Bulb Terne Plate Spout with Brass Fittings & Screened to Prevent Clogging. 8 oz. Size Only.
$ 9.50 Doz — in Doz. lots.
$10.40 Doz. — in less Doz. lots.
F. O. B. Jersey City, N. J.

Thos. W. Houchin Corp.
87 Ferry St. Jersey City 7, N. J.
Mfgr. Insect Powder Guns
Established 1851

KEEP YOUR MEN INFORMED
Have a copy of PESTS Sent to Each Service Man
Subscription Rates
1 year, $4.00 2 years, $7.00
Countries Outside the United States including Canada
1 year $4.50; 2 years $8.00; 3 years $11.00
PESTS AND THEIR CONTROL
1900 Euclid Building Cleveland 15, Ohio



CHAPMAN "PENTA" PRESERVATIVE

POSITIVE

in results. Exhaustive tests and commercial use over a period of 10 years have proved that Chapman "Penta" Preservative provides dependable protection against termites. "Penta" Preservative contains pentachlorphenol, extremely toxic to termites.

QUICK

in action. Used as a soil poison, "'Penta" Preservative rapidly penetrates and poisons the ground. Termites need only touch "Penta" Preservative with feelers, legs or bodies to be poisoned. Swabbing or spraying the wooden structure with "Penta" Preservative provides an additional safeguard, also preserves the wood from decay and rot. Thorough treatment is effective for years.

CONVENIENT

in application. Chapman "Penta" Preservative is colorless, almost odorless, and clean to handle. Treated wood is not damaged or discolored, and takes paint, varnish or stain.

For the whole story on termites—and how you can give your customers maximum protection against them with Chapman "Penta" Preservative — write for our free literature.

Here's Sales Help
for Pest Control Operators

Chapman has prepared this attractive mailing piece to help you sell your services. Write for details.

CHAPMAN

CHAPMAN CHEMICAL COMPANY
Suite 752, Dermon Building, Memphis 3, Tennessee

"PENTA" PRESERVATIVE IS SUPPLIED IN A 1 TO 10 CONCENTRATE
FOR PEST CONTROL OPERATORS.

TAKE NO CHANCES

Chlordane will settle out if packed in ordinary metal containers!

COOK'S CHLORDANE Is Packed Only In Glass Jugs or Aluminum-Lined Drums!

COOK'S 20% REFINED CHLORDANE CONCENTRATE

This is 20% by weight. To be diluted 9:1 with deodorized petroleum solvent.

4 / 1 gal. glass jugs to case	**$3.25 per gal.**
30-gal. aluminum-lined drums	**$2.75 per gal.**

COOK'S CHLORDANE EMULSION CONCENTRATE

To mix with water. For industrial and vegetation use. Kills roaches, water-bugs, grasshoppers, mites, chiggers, red bugs and certain other insects. CONTAINS 4 LBS. CHLORDANE PER GALLON.

4 / 1 gal. glass jugs to case	**$7.25 per gal.**
30-gal aluminum-lined drums	**$7.00 per gal.**

NOTE: Case lot shipments only . . . Freight paid on all sales of 100 lbs. or over.

Cook Chemical Company

935 NORTH WABASH AVENUE KANSAS CITY 1, MISSOURI

MAKERS OF FAMOUS COOK-KILL BUG KILLER

Printed in U. S. A.